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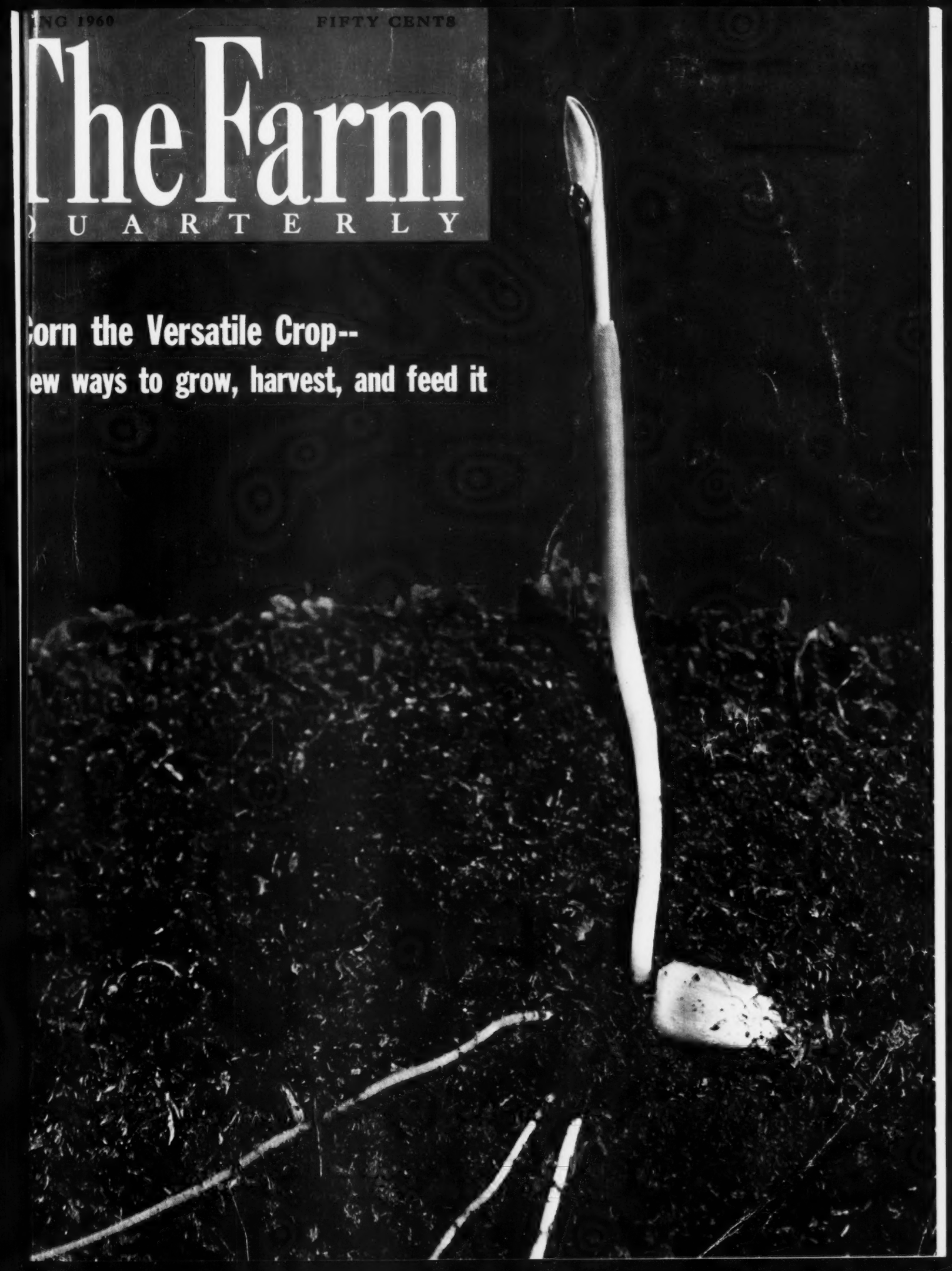
The Farm
QUARTERLY



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ew ways to grow, harvest, and feed it

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"They treat you fine at the Goodyear Sign!"

only with TRACTION SURE-GRIP

the peak efficiency of "TOTAL TRACTION"

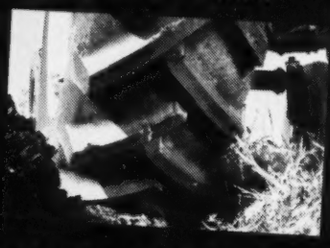
That's how TRACTION SURE-GRIP develops "*total traction*" to make the most of your modern tractor's higher horsepower – give you more work, in shorter time, on less fuel.

And TRACTION SURE-GRIP is built with 3-T Processed Cord too! 3-T Processed Cord is triple-tempered by the exclusive Goodyear process involving Tension, Temperature and Time. It gives you new freedom from bruises, buckle breaks, cracking.

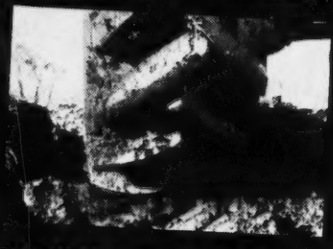
ON-THE-FARM SERVICE. Your Goodyear dealer is equipped to deliver, mount, fill or repair tractor tires right on the spot. He'll supply free loaners while your tires are being repaired or retreaded. He'll give you expert help on tire maintenance. Call him in to quote you his liberal trade-in tire allowances!

Goodyear, Farm Tire Dept., Akron 16, Ohio.

See how it works!



THE START: TRACTION SURE-GRIP thrusts solidly against walls of earth behind its lugs—a greater area to utilize the torque because the lugs are longer, deeper and ruler-straight.



THE FIRST FORWARD MOVE: Now the lugs, wider apart at the tire center than at the shoulders, actually wedge the soil between them for a vise-like grip that cuts way down on slippage.

THE SHOULDERS ADD THRUST: The TRACTION SURE-GRIP lugs, running right down the sidewalls, add many extra square inches of traction area. This thrust at the sides of the tire, as well as under it, results in "total traction."

Tops in front tire performance

NEW SUPER-RIB

3 ribs for better steering, better flotation, better wear!

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Sure-Grip–T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

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INTERNATIONAL® TRUCKS

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Cunningham "Commander" Model 8-58
Hay Conditioner

The World's Number One Conditioner! Crimping reels guaranteed unconditionally—a Cunningham exclusive. Adjustable parking jack is standard equipment.

Cunningham "Ranger" Model 8-15
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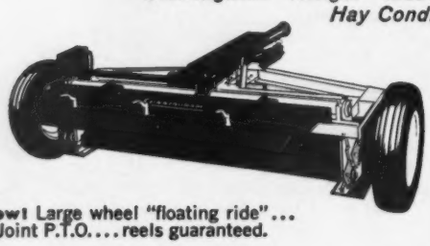

New! Large wheel "floating ride"... 3 Joint P.T.O.... reels guaranteed.

Cunningham "Pacer" Model 60
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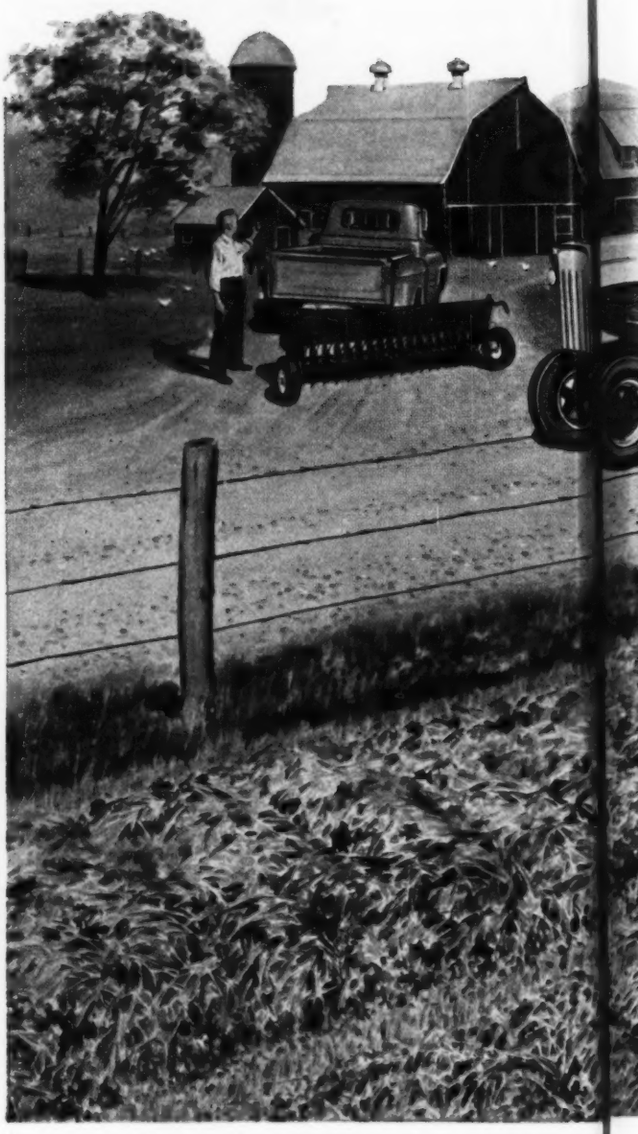
New! Heavy duty construction at low cost—not a stripped down model.

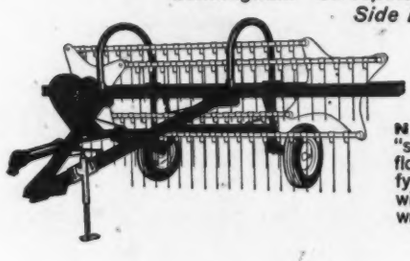


Cunningham... the number one name in hay conditioning... Now introduces these New ways to better hay!

There's no need to settle for a "second best make" to get the features you prefer in a hay conditioner, whatever you're looking for, Cunningham has it! Here's proof! The *"Commander"* has more acres of conditioning experience than all competitive makes combined. Or, the *"Ranger"* may be right for you... bold new features... with the same, proven Cunningham crimping action and rugged construction. The *"Pacer"* combines economy and heavy duty construction.

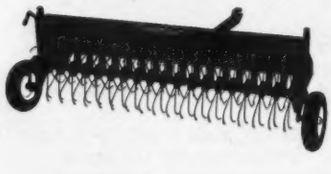
The new *"Sweepstake"* introduces a new principle to hay raking . . . gentle, leaf saving action that treats your hay with care . . . no stripper bars to tear leaves. The new *"Roto-Tedder"* gently lifts the swath, turns it over and fluffs it, putting the shaded underside on top for "hours faster" curing . . . for better hay at the lowest possible cost.

Cunningham "Sweepstake" Model 96
Side Delivery Rake



New! Gentle "sweeping action" floats hay into fluffy windrows . . . without roping or wrapping.

Cunningham "Roto-Tedder" Model 44



New! Does more for your hay... at lower cost... than any machine you have ever pulled across your hayfield.

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Cunningham builds more into 'em... so you can get more out of 'em!

Here's proof! Ace Ralls, at left, Farm Mgr. on the J. J. Elmore Desert Ranch, Brawley, Cal., has conditioned over 22,000 acres of hay in 3 years with this Cunningham Hay Conditioner... all with the original crimping reels . . . still in good condition! This ruggedness is a built-in feature of all Cunningham equipment. *See your Dealer today.*

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Your veterinarian...
a specialist in Animal Health

There is much at stake these days in owning and managing livestock. Keeping your animals producing at a profit means, first, keeping them healthy. It also means having a friend as near as your telephone to diagnose — to prescribe — but even more important to *prevent disease.*

To many, this man is fondly known as "Our Vet." To others who employ him for periodic consultation, he is a specialist in Animal Health, an important adviser in a profitable livestock enterprise. His trained eye can detect symptoms of disease while still in the early, controllable stages. He knows the most effective ways to prevent the spread of infection to save valuable animals.

Animal Health is profitable

It will pay you to help your veterinarian in every way you can. One of the most beneficial ways is to keep accurate health and breeding records for every animal in your herd. This will make accurate diagnosis easier and permit prompt and proper treatment.

As an expert in Animal Health, your veterinarian brings to you all the latest discoveries of veterinary science — knowledge which can save you, *many times over,* the cost of his professional services. Many of the new drugs, for example, are almost miraculous in their effect when administered by a man skilled in their use.

Many of these drugs bear the name E. R. SQUIBB & SONS. It is your assurance of pharmaceuticals thoroughly tested . . . of proved purity and potency. More than 100 years of experience as a manufacturer of precision drugs are behind the Squibb name . . . a name in which you can unhesitatingly place your trust.

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For prompt, accurate diagnosis, always consult your veterinarian.

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"For every dollar a livestock owner invests in veterinary services, it is estimated he gets a return of $5.78 on his investment*", says Dr. C. D. Van Houweling, Agricultural Research Service, United States Department of Agriculture.

*Figures based on a study made by the Veterinary Services Committee of the American Veterinary Medical Association

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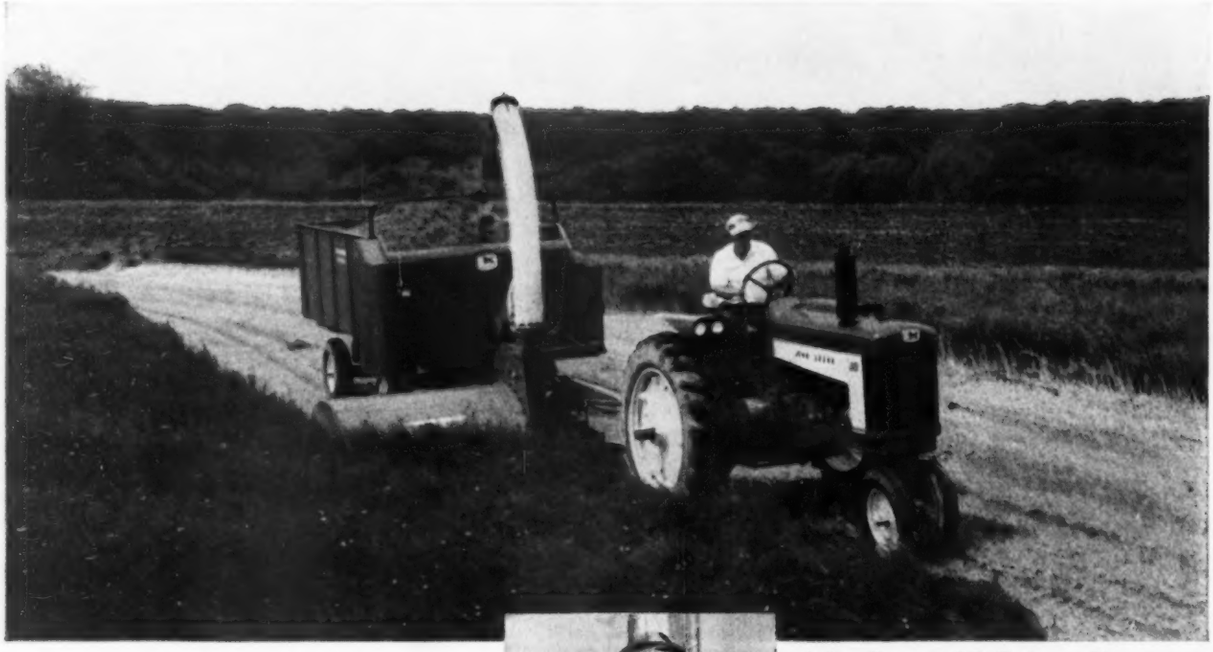


"Machines like these will keep boys on the farm"

says Mr. James Vincent, Cochranville, Pa.

John Deere 15 Rotary Chopper

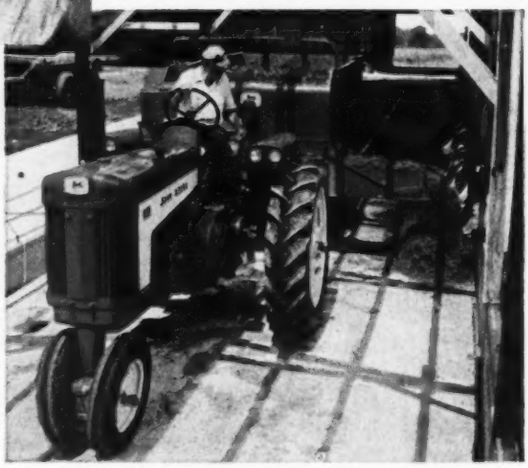
This flail-type harvester not only chops green feed and makes quality silage but also shreds and spreads stalks and brush . . . handles many other jobs at low cost.

"I own a combination of ideal machines for my dairy operation—the John Deere 15 Rotary Chopper and the Self-Unloading 110 Chuck Wagon. I pasture my herd mechanically, fill silos, and feed silage fast and easy with this equipment. I believe it's machines like these that will keep boys on the farm.

"We feed twice a day on our green-chop operation. The 15 Chopper gets a wagonload in less than ten minutes and the Chuck Wagon unloads itself in the feedlot in less than five minutes. You take the chore out of feeding—that's why my boys like to feed with this outfit.

"You can pretty nearly double the number of cows you feed with mechanical pasturing—and the John Deere 15 Chopper is perfect for the job. It's extremely simple with plenty of capacity for the heaviest crops.

"I use my John Deere 110 Chuck Wagon Mixer-Feeder every day—summer, winter, rain, or shine. It has given me absolutely no maintenance trouble—and that's important on any feeding operation."



John Deere 110 Chuck Wagon

The Chuck Wagon delivers from side or rear at 5 different speeds with the flip of a lever. It also mixes concentrates for side delivery into feed bunks, blowers, and elevators.

For fast, efficient feeding, see your John Deere dealer.
Ask about the John Deere Credit Plan.

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Please send me free folders on the following John Deere Forage Equipment: ☐ 15 Rotary Chopper ☐ 110 Chuck Wagon Mixer-Feeder.

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New lightweight PIONEER CHAIN SAW handles any farm cutting job!

The all-new PIONEER "400" will cut your firewood, fence posts, brush, dock stakes or what-have-you with an ease that's hard to believe! This surprising chain saw trims and limbs orchard or ornamental trees quickly . . . tackles a thousand tough farm and wood-lot cutting jobs . . . accomplishes them with minimum effort.

Here at last is a truly lightweight chain saw that makes sense. Weighs only twenty pounds . . . shaped and balanced to handle with utmost ease. Yet the new "400" is tough . . . packs the lugging power to double as a production chain saw for farmer-loggers who harvest annual tree crops.

But seeing is believing! Prove to yourself how this powerful, tremendously versatile new chain saw will fit your operation. Call your PIONEER dealer now for a free demonstration.

FREE ILLUSTRATED BOOK

"How to Make Dollars and Sense with Your PIONEER Chain Saw." Write for free copy today!

PIONEER SAWS

DIVISION OUTBOARD MARINE CORPORATION
Department PFQ-30, Waukegan, Illinois

The Farm QUARTERLY

Spring, 1960, Vol. 15, No. 1

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THE FARM QUARTERLY

22 East Twelfth Street, Cincinnati 10, Ohio

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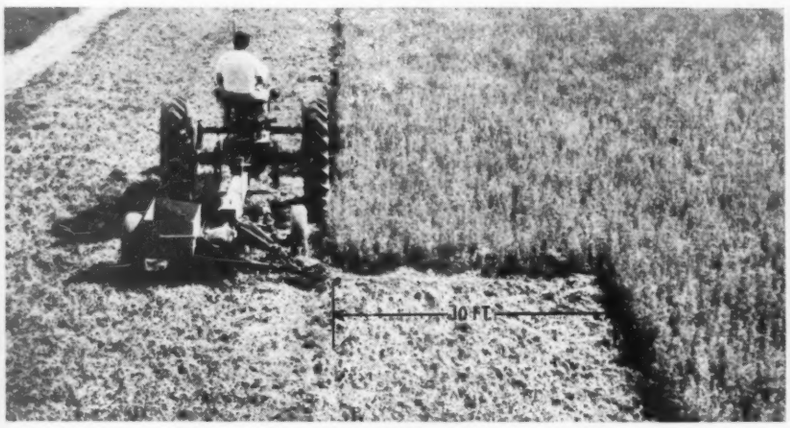
Summer issue on sale May 6 at all Class A newsstands. Note that Farm Quarterly is being published one month earlier to help you in your pre-season planning.

NEW

Hitch-and-Go Haymakers from NEW IDEA

HITCH-AND-GO MOWER. Drop pin, snap on PTO and mow! NEW IDEA full trailing mower zips through heaviest stands . . . clips clean . . . cuts even. Simple, rugged counter-balanced pitman can't be beat for non-plug cutting and low cost upkeep. This latest model NEW IDEA mower built heavier, stronger than ever before. Choice of mechanical or hydraulic cutter bar lift. Also available is a semi-mounted mower which teams with NEW IDEA hay conditioner for one-time-over mowing and conditioning.

HITCH-AND-GO RAKE does superb raking job behind any tractor. Parallel bars revolve like clockwork on sealed-for-life ball bearings. Gentle action rolls hay into fluffy, free-breathing windrows. Single easy-to-reach crank controls transport lift and raking height. Has tractor-seat clutch control. Short-coupled trailer-type design for easy turning, backing. Only 2 daily grease points. Also available as a mounted rake for tractors with 3-point hitch, I-H Fast Hitch, or A-C Snap Coupler!



NEW IDEA GIANT 10-FOOT MOWER and 10-FOOT RAKE

pay for themselves with savings of time and fuel!

NEW IDEA 10-foot full trailing mower does 10 hours mowing in six! Staggered wheels, extra heavy construction and weight box allow mower to trail perfectly. Used with tremendous success in the toughest grasses known!

NEW IDEA finger wheel attachment extends NEW IDEA pull type parallel bar rake (above) to 10-foot raking width. Finger wheel can be disengaged and held in transport position when smaller windrows are desired!

HITCH-AND-GO HAY CONDITIONER. Let it rain! Your hay's in safely one day sooner when you condition with this NEW IDEA. Big self-cleaning rubber roll and fluted steel pick-up roll provide positive feed-through with less wrapping, less plugging. Stems split. Leaves stay. Easy to adjust roll pressure for best quality hay. NEW IDEA conditioner is perfectly balanced for easy one man hook up. Not damaged by rocks. Available with convenient one-crank transport lift or with hydraulic lift. Windrow deflectors bolt on when desired. Use behind tractor or in tandem with NEW IDEA semi-mounted mower. Makes its own down payment with the very first crop it saves!

New NEW IDEA *Hitch-and-Go Haymakers fit every make and model of tractor. See your friendly, helpful* NEW IDEA *dealer or mail this coupon today!*

NEW IDEA Box 247, Coldwater, Ohio

Please send free literature on the following NEW IDEA haymakers.

- ☐ Full Trailing and Semi-Mounted Mower
- ☐ Pull Type and Mounted Parallel Bar Rake
- ☐ Hay Conditioner
- ☐ Harvester-Shredder
- ☐ Forage Box and Bunk Feeder
- ☐ 10-foot Mower and 10-foot Rake

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NEW IDEA FLAIL-TYPE HARVESTER-SHREDDER with 3 hitch-and-go trailing positions! Cuts, chops and loads green feed in one time over. Shreds stalks. Clips pastures. Discharge at top for wagon loading; or above shredding chamber for uniform ground distribution. Trails behind, semi-offset, or full offset. Perfect team-mate for the NEW IDEA *Forage Box and Bunk Feeder*. Most ruggedly built box you can buy. Unloads from side or rear!

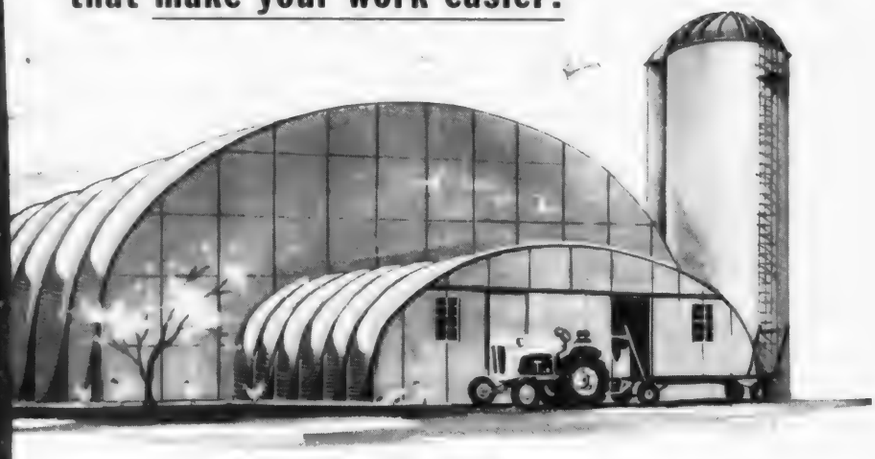
NEW IDEA

PRODUCTS OF AVCO CORPORATION

this panel supports itself...

builds clear-span structures

that make your work easier!



This is the practical way to build on the farm — with the rugged strength of steel and patented Wonder Building construction. Heavy-gauge, zinc-coated panels are double-curved and corrugated to form a rigid, self-supporting structure. No posts, pillars, braces or trusses!

Clear, unobstructed interiors make your work easier. You can use a full range of labor-saving power equipment *without restrictions,* park the largest combine with ease — store bulky crops without labor problems.

Wonder Building structures adapt *readily and economically* for every farm use... grain storage, stock housing, dairying, machinery storage, utility. They are weather-tight, rodent and verminproof. Fire-resistant!

You can select a Wonder Building structure in straight wall, semi-circular or open storage type — in widths up to 82 feet, any length. And, save 50% in building costs, construction time! What's more, you and a helper can erect it in a few days' time.

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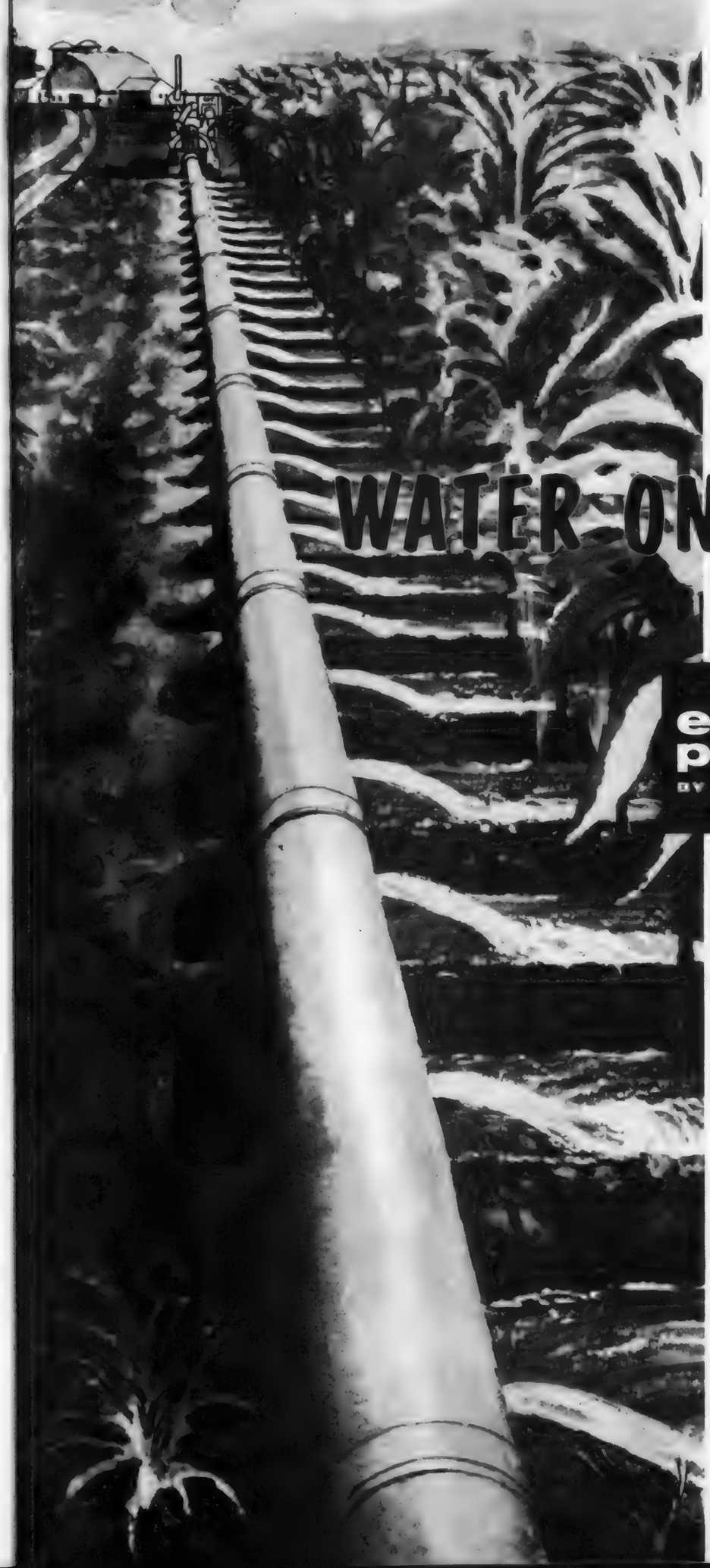
Wonder Building Corporation of America 30 N. LaSalle Street, Chicago 2, Ill

LOW COST FINANCE PLANS AVAILABLE. Let your Wonder Building structure pay for itself while you use it! Special purchase arrangements feature low down payment, attractive interest rates — budget installments.

WONDER BUILDING® "Farm-Planned" STRUCTURES

Franklin adv. A-108

Gated pipe irrigation — popular for long runs over rough ground.



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makes the crop

engine power
BY CATERPILLAR

makes the difference!

When you're considering an irrigation system, a dependable water supply is only part of the picture — you need an equally dependable power source. Specify Caterpillar Engines and be absolutely sure of getting all the performance, power and economical operation you paid for. Built by the 30-year leader in the manufacture of farm diesels — in the world's most modern engine plant.

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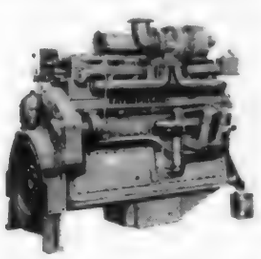
CATERPILLAR TRACTOR CO., PEORIA, ILL.



Cat Diesels up to 650 HP. Cat Natural Gas Engines in 210 HP to 470 HP range available, built to Cat Diesel long life and performance standards — proven up to 26% more efficient than other gas engines. Your Cat Dealer will tailor the engine, cooling and starting system and other attachments to your needs.

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To make the TOP PROFIT from every Corn Acre

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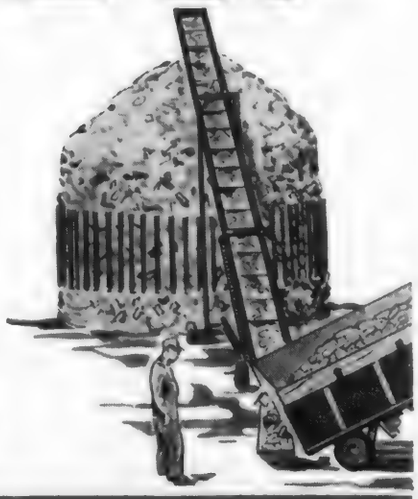
You get more out of PIONEER because more has gone into PIONEER . . . more basic research . . . more widespread testing in both field and official tests.

PIONEER produces GREATER PROFITS for its growers because PIONEER germinates strongly . . . grows vigorously . . . stands straight . . . matures properly . . . picks easier and more efficiently . . . and produces LARGER YIELDS of sound quality corn.

PIONEER offers an outstanding hybrid variety to match every maturity . . . to meet every soil and weather condition.

For Assured Dependability . . . for BIGGER YIELDS and GREATER PROFITS . . . plant PIONEER. See your local PIONEER Salesman TODAY.



PIONEER Hybrid Seed Corn is produced by the following companies:

Gerst & Thomas Hybrid Corn Co. Pioneer Hi-Bred Corn Co. Pioneer Hi-Bred Corn Co. Pioneer Corn Co., Inc.

The Collison brothers (left to right), Vincent, Milford and Marvin, talk tires with Firestone representative Everett Bliss.

"FIRESTONES ARE THE TOUGHEST TIRES WE'VE EVER PUT ON TRACTORS!"

say Vincent, Milford and Marvin Collison, of Collison Bros., Arcadia, Iowa. "Firestones are the toughest tires we've ever used! Our 11 tractors work long hours, cover a lot of ground. Tire trouble is one thing we can do without—and we've never had any trouble with our Firestones! And our Carroll Firestone man, Everett Bliss, gives us service that's really worthwhile!"

Like the Collison brothers, you'll find these exclusive Firestone features deliver extra service at no extra cost!

- Firestone's *curved* and *tapered* traction bars deliver full power to the draw-bar, clean automatically!
- Firestone Rubber-X, the longest-wearing rubber ever used in Firestone tractor tires, extends tread life.
- Firestone Rubber-X special compound for sidewalls *only*, resists aging and costly furrow-buckling.
- Firestone S/F (Shock-Fortified) cord is stronger . . . delivers greatest impact resistance of all farm tires.
- Firestone FREE New Tractor Tire Loaner Service lends tires during retreads and repairs.

For outstanding traction and greater economy, get Firestone All Traction Champion, Firestone Champion Ground Grip or special purpose Firestone All Non-Skid tractor tires at your Firestone Dealer or Store.

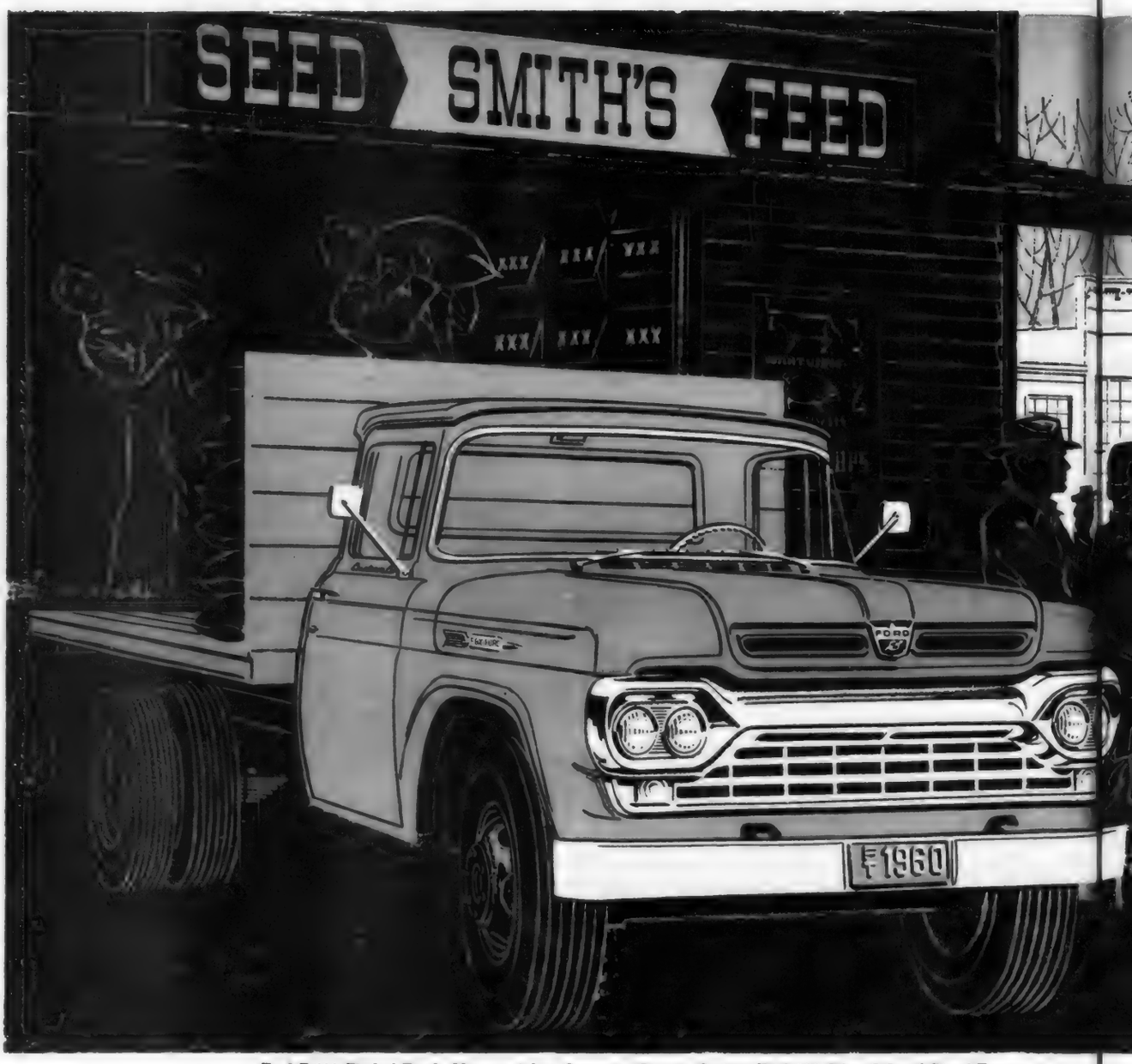
*Firestone T.M.

ALWAYS A YEAR TO PAY

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1960, The Firestone Tire & Rubber Company



Ford F-600 Flatbed Truck, Mercury 4-door Commuter Country Cruiser, Ford 881 Select-O-Speed Diesel Tractor.

Want to save time and effort? Switch to Ford power farming

Wherever you go these days you'll find folks saving time and effort with Ford Power Farming.

Take Dick Williams. It's not likely he'll find a hauling job that his Ford F-600 Flatbed can't handle. The F-600 is just one of many Ford Farm trucks engineered for your needs and they're the lowest priced of all leading makes!

That's Jim Johnson about to take delivery on his new Ford 881 Diesel tractor. Jim's tractor is equipped with Ford's exclusive Select-O-Speed, which lets you shift on the go. (Select-O-Speed is another recent development in Ford's continuing program to meet every farming need.)

Another member of the Ford Farm Family that goes light on your wallet is Mercury's new 4-door Commuter Country Cruiser. This rugged beauty, at a new low price, turns rough byways into pleasant highways.

These are three of the many Ford Farm Family products that have become "buy-words" for value all over the country. Why not investigate? There's more profit—and more time to enjoy it—when you invest in the Ford Farm Family.

FORD MOTOR COMPANY THE AMERICAN ROAD, DEARBORN, MICHIGAN

THE FORD FARM FAMILY: TRUCKS • TRACTORS • IMPLEMENTS • CARS • INDUSTRIAL ENGINES

Make More - Keep More with STORMOR

STORMOR BATCH DRYERS

3 SIZES { 750 Bushels, 1000 Bushels, 1250 Bushels

Better drying at less expense is truly yours with a Stormor. Here's why:

It removes an average of 2 percentage points of moisture per hour from shelled corn—at a cost of only a penny per bushel for every five points of moisture removed.

Operating at only 140 degrees of heat, a Stormor removes only the moisture—leaves no odor or discoloration. Grain isn't cracked, either.

A Stormor saves you time and labor, too, because its big capacity and automatic safety controls eliminate the need for constant attention.

Equipped with 36" fan and 4,000,000 BTU burner. Operates off 10 HP motor or tractor PTO.

STORMOR DRY-O-MATION

The lowest cost way to store and condition your grain . . . a combination of Stormor steel bins plus automatic humidity control. Special drying fans and supplemental heat units maintain ideal temperature and moisture regardless of outside weather.

Bins made of heaviest gauge corrugated, galvanized wall sheets in a full range of sizes from 1,000 bushels to 20,000 bushels. Bins and drying equipment may be purchased separately or as complete units.

STORMOR STEEL CRIBS

Thousands of unique louvered perforations permit natural air circulation while protecting grain against wind, rain, snow and rodents. Can be equipped with center ventilator tube, fan and supplemental heat unit for high moisture corn. Nine sizes: 500 to 3,500 bushels.

RUSH COUPON FOR COMPLETE INFORMATION

Some Dealer and Distributor Areas Open

FREMONT MANUFACTURING CO.

Dept. Q-2, Box 348 Fremont, Nebraska

Please send information on Stormor

☐ batch dryer ☐ steel bins ☐ distributorship
☐ steel cribs ☐ fans and heat units ☐ dealership

NAME_____

ADDRESS OR RFD _____

CITY_____ STATE_____

LETTERS

Life and Death of the Farm

Sirs:

May I congratulate you on your fine article, "Death of an East German Farm." This gave the first insight into the true meaning of the loss of private ownership of the farm. So often I hear it said nowadays that farming is not a way of life; it is a business. I'll agree to a point that it is a business but still to be a true farmer one must have a deep love of the soil and the blessing of nature. This the German farmer believes. The threat to our way of life by Communism is a real threat, that of destroying the very foundation of our way of life. This is not an immediate threat: it is the process of many years and a slow undermining of our very lifeblood, FREEDOM.

Boyd E. Daniels
Asst. Director of Org.

Colorado Farm Bureau
Denver 2, Colorado

Japanese Beef

Sirs:

I want to endorse part of what you quoted from a Col. Sweeney about Kobe (pronounced Ko-be) beef in "Over the Back Fence," FARM QUARTERLY, Summer, 1959. Having spent some two years among agricultural people throughout Japan, I have had the privilege of partaking of some of the finest of all the wide variety of delicious meals the country has to offer. I must say that the Japanese know their beef. Even in far northern Hokkaido the complete "sukiyaki" supper would not be correct without Kobe beef. In my experience so far, it is the best in the world. In my own mind I could never resist comparing it with what I had previously enjoyed at the annual dinners of the Western Cattlemen's Association in Oklahoma City.

Wherever quality of beef is discussed in America, emphasis is placed on the characteristic known as "marbling," or the intermingling of layers of fat and lean meat. It is well known that the fat improves the flavor; however, the final consumer often discards the fat parts after they have been used for flavoring. This is not so with Kobe beef. The desired condition is known as "speckling," in which the fat and lean are thoroughly interspersed, all the lean is tender, and none of the fat is discarded. Thus the final consumption percentage of the carcass is somewhat higher than that of its American counterpart.

Among both producers and consumers there are differences of opinion as to which is the major factor responsible for the superior quality of Kobe beef, whether the massage or the feeding. It is generally agreed that both, and the absence of exercise, are important, the argument being only one of the relative degree of importance.

To the Japanese farmer, the production of beef is a hard-headed business proposition, just as production is to most American farmers in their respective lines. I fear that the Colonel has over-glamorized the process by relating the tradition instead of the facts. Good Kobe beef is produced by families not having a most beautiful daughter or even an eldest son; without the use of any beer whatsoever; and from other animals as well as three-year-old virgin females.

F. L. Underwood
Agricultural Economist

Kentucky Contract Team
ICA, University of Indonesia
Bogor, Indonesia

Modern Tulls

Sirs:

I enjoyed your article on Jethro Tull very much. While I am stationed here in England I am meeting as many of the men who are interested in advancing agriculture as I can. Some of the "pioneers in better farming" I am meeting here remind me of Tull.

William G. Wells, Jr.
Lt. Col. USAF

Hq. 7th Air Division—DPL
APO 241, New York, N. Y.

The Best

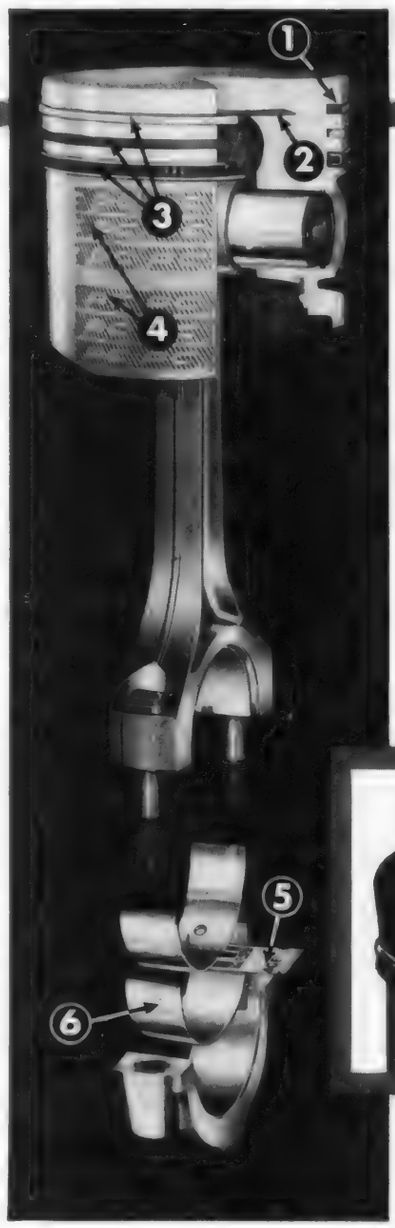
Sirs:

One of your best issues as far as I'm concerned was the issue on automation, Winter 1960. We are thinking of adding two silos to our present upright and your idea of putting a common top on silos in order to move the unloader will be a must.

Harold A. Tutvedt

Kalispell, Montana

7 ways to save worn engines with PERFECT CIRCLE POWER SERVICE!



1. Save by using Perfect Circle Manulathe. Accurately and quickly regroove worn top ring grooves. Practically all worn aluminum pistons require this operation when new rings are installed.

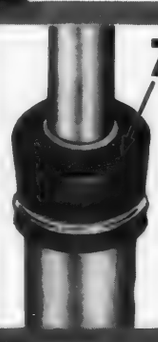
2. Save by using Perfect Circle tempered steel spacers for re-machined ring grooves. Precision-made to compensate for increased groove width. Retards ring and groove side wear.

3. Save by installing Perfect Circle 2-in-1 Chrome piston rings. Both top rings and oil rings are plated with thick, solid chrome that resists wear, more than doubles life of cylinders, pistons and rings.

4. Save by using Perfect Circle Nurlizer. Proved by more than 14 million successful installations. Restores pistons to correct fit, accurately, quickly and permanently, for only a fraction of the cost of new pistons. Nurlized surface assures adequate piston lubrication, reduces cylinder and piston wear, eliminates piston slap.

5. Save by using Perfect Circle Plastigage. Bearing clearances can be quickly and accurately checked in as little as one-third the time required by older methods. Available in three types covering these clearance ranges: .001-.003, .002-.006, .004-.009.

6. Save by using Perfect Circle Taper Shim Bearing Adjuster. Custom-made to correct excessive clearance in main and connecting rod bearings, pre-cut and scientifically tapered. Precision fit assured. Custom-made for all popular engines in .002, .003, and .004 thicknesses.



7. NEW! Save by installing Perfect Circle Valve Seals. Newest PC Power Service product stops oil loss through valve guides on overhead valve engines. For best performance, greatest economy, install Perfect Circle Valve Seals when valves are reconditioned and when new rings are installed.

With so many ways to economically extend the life of worn engines—no wonder Perfect Circle products are preferred for top performance and efficiency.

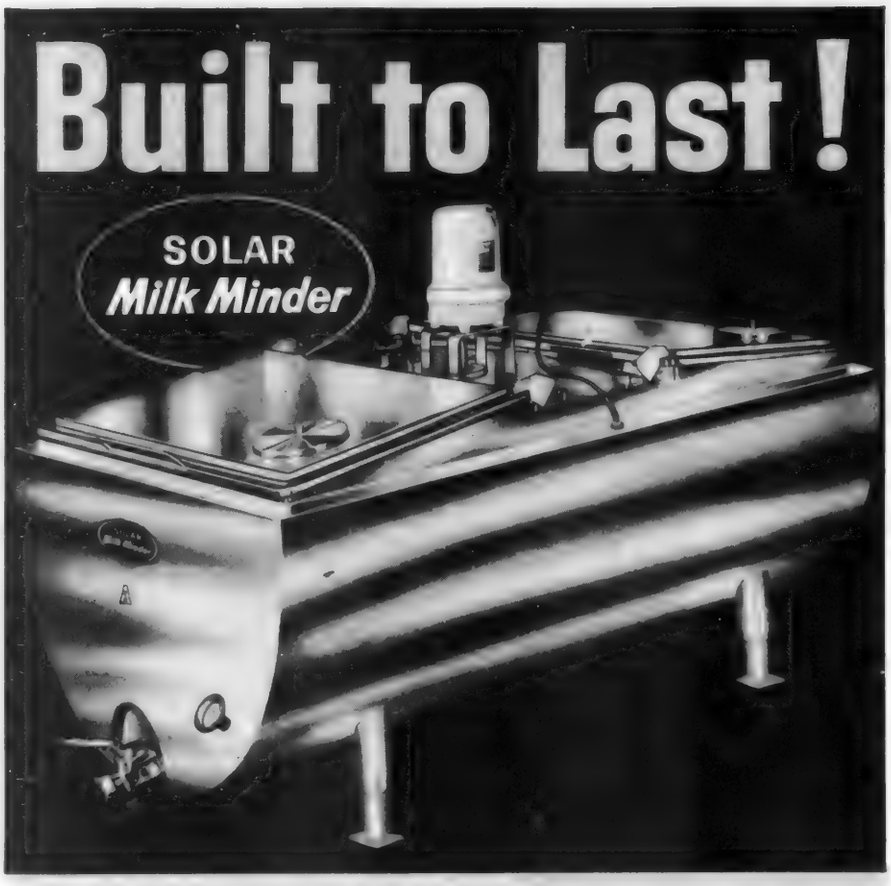
PERFECT CIRCLE

PISTON RINGS — POWER SERVICE PRODUCTS

Hagerstown, Indiana

In Canada: Don Mills, Ontario

Built to Last!



the all 18-8 stainless steel bulk milk tank!

Makes your first bulk tank investment a lasting one!

The SOLAR Milk Minder is built to last a lifetime. It uses 18-8 stainless steel throughout, does not mix metals in tank shells, coils and lines. Such mixing or combinations of copper, mild steel and stainless steel helps to create corrosion hazards that shorten bulk tank life.

SOLAR uses all 18-8 stainless steel to protect your bulk tank investment. There's no chance for leaky joints to develop inside the tank to start rust and corrosion. This can happen in tanks that have welded joints of different metals.

The all 18-8 stainless steel Milk Minder gives you lifetime performance and service. It makes your first bulk tank investment a lasting one. Before you buy, see your SOLAR dealer or write direct for more information.

USI **Solar Permanent**

DIV. OF U. S. INDUSTRIES, INC. • TOMAHAWK, WISCONSIN • PHONE 540

FOR 95 YEARS
Better Milking Equipment
SOLAR
Milk Minder
For Better Farm Living
1865 · 1960

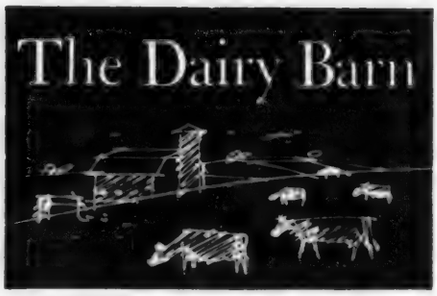
Solar Permanent FT 56 Q
Tomahawk, Wisconsin

Please send me a copy of your booklet, "Class Will Tell in Cows, Too!"

Name_____

Address_____

City or Town_____ State_____



Environment and Production Every dairyman knows (when reminded) the effect of environment on milk and butterfat yields. Certainly a cow milks better if she is fed better, or treated better. The question has been: How much better? Enough to worry about?

Yes, unquestionably yes, is the answer. The Department of Dairy Husbandry at the University of Wisconsin has produced some spectacular facts on the effect of milking and feeding practices.

The facts are part of a study—still under way—with a fascinating goal. Their object is to discover a test of a dairy farmer which will allow an observer (such as the DHIA tester) to evaluate the farmer on a scale—which would show how much effect his dairy practice had on the yield of his cattle. Then, if two farmers were indexed in this way, it would be possible to adjust the yield of a cow to estimate what she would do in another herd. Breeding and selection would be faster—as daughter-dam comparisons could be made without the environment factor interfering between herds.

How much effect does the environment have? Forty-three herds were examined, from 1953 to 1956 and, after analyzing this and other research, the Wisconsin scientists believe from 50 to 70 per cent of the variation in individual milk and fat records is due to feeding and management.

Milking practice has the greatest effect. Herds were graded in four steps: poor, fair, good, excellent; moving up one step caused an average gain of 800 pounds of milk and 33 pounds of butterfat in a 305-day lactation. Two steps meant an improvement of 1,600 pounds of milk and 66 pounds of fat. Moving from poor to excellent could gain a farmer 3,200 pounds of milk and 132 pounds of butterfat.

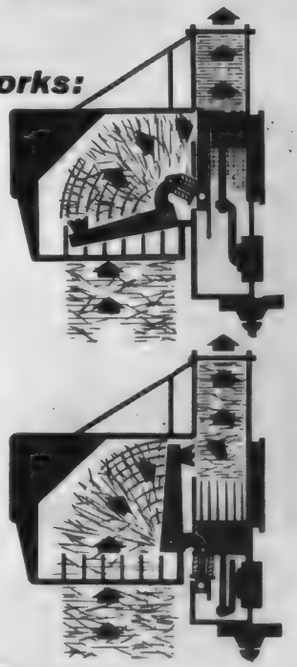
Though milking practice was the most important, other influences had big effects. As the pounds of total digestible nutrients (TDN) rose from 14 pounds per 1,000 pounds body weight to 22 pounds per thousand, milk production rose 666 pounds per pound TDN and butterfat rose 24 pounds per pound. Or if Clara ate 17 pounds TDN daily per 1,000 pounds body weight and Betty had 18 pounds per thousand, Betty would produce 666 pounds more milk and 24 pounds more fat in 305 days than underfed Clara in the same herd.

As herd size went up, butterfat went down—seven pounds per lactation for each increase of six cows in the herd from 22 to 46. So the herd butterfat average would be

(*Continued on page* 22)

NEW CASE 200 *SweepFeed* BALER gives you 10-ton capacity at a RECORD LOW PRICE!

Here's how Sweep Feed works:



Sweep fork is in forward position ready to sweep a fresh charge of hay into the bale chamber, while the plunger compresses the previous charge.

Here the direct-connected plunger is retracted while the sweep fork delivers its new charge of hay to the bale chamber.

Priced with the Lowest

Simplification of entire baler power train eliminates many complicated parts common to other balers . . . permits extremely rugged construction and up to 10-ton-per-hour capacity at a record low price. One sweep of the fork moves hay from pick-up to bale chamber.

Smooth, Counterbalanced Sweep Feed

Sweep fork is direct-connected to the plunger . . . one counterbalances the other to make the Case 200 the smoothest, quietest-operating baler in the field. No surging . . . can't get out of time.

Gentle Hay Handling

Each sweep of the fork feeds a full charge of hay into the bale chamber gently and evenly . . . no augers, no "kickers" to tear and lose leaves.

Ask for a Demonstration!

CASE 200 BALER
Easy to own
Easy to operate
Easy to maintain

See your Case dealer today. Find out how little it will cost you to own a new Case 200. Case Crop-Way Purchase Plan available if you need it.

J. I. CASE

J. I. CASE CO. • RACINE, WIS.

1st in Quality for Over 100 Years

MAIL TODAY

Get the answers to your questions about this revolutionary new Case Baler. Send for colorful illustrated catalog. Mail to J. I. Case Co., Dept. C-900, Racine, Wis.

Name_____ Student ☐

Address_____

GEHL'S FORAGE
you drive and ride through

GEHL'S BIG 7 answers your need for king-sized capacity, nonstop stamina, good price . . . and easy use.

Take the Self-Propelled Chop-All for example. Nothing can stop or top this big fellow. Same goes for the PTO Chop-All . . . and for the rest of the Big 7, too.

There's the versatility of Gehl's Self-Unloading forage box! the Hi-Throw Blower's capacity! the Cure-All's leaf-saving action! the Clean-Cut's over-lapping knives! the 72 Chopper's 6-foot cut. Do these machines pay off? Thousands of owners say, "yes!"

You, too, can count on Gehl for fine, priced-right forage handling equipment . . . because the Gehl goal — like yours — is to put a hex on handwork and keep your time-profit return on equipment as high as possible.

When you buy, be sure Gehl's power-partners are the machines you investigate. The coupon brings detailed facts on the Gehl of your choice.

GEHL'S POWER-PARTNERS . . .

LIFT THE BURDEN FROM YOUR BACK. MAKE YOUR TRACTOR PAYBACK MORE

4
New 72 Chopper cuts and loads a 6-ft. cut... for green chop, corn stalks, hay, trash.

5
Self-Prppelled Chop-All chops 60 tons an hour... sets a new timetable for silo filling, green feeding, corn harvesting.

6
Hi-Throw Blower shoots 60 tons an hr. up an 80-ft. silo. Handles every crop — forage or grain.

PARTNERS...
your busiest seasons

7
Self-Unloading Box unloads automatically, on the move or parked. Buy it assembled or in metal parts kit.

GEHL
101 YEARS OF SERVICE

GEHL BROS. MANUFACTURING CO.
Dept. TC-21-4, West Bend, Wis.

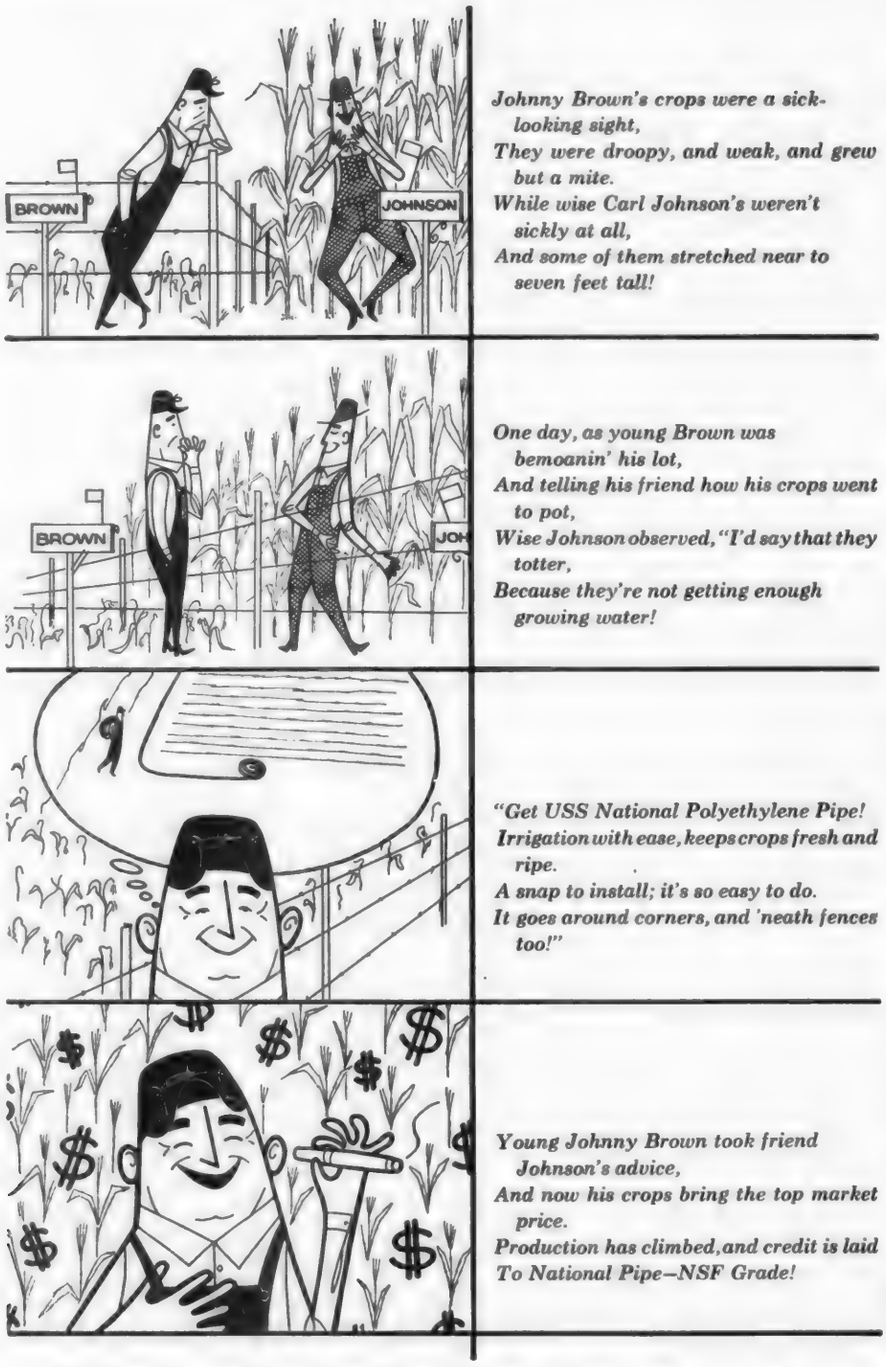
Please send more information on the Gehl Big 7 Forage-Partners I have checked.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
☐ 6 ☐ 7 ☐ I am a student

NAME .....

ROUTE ..... TOWN .....

STATE .....



Johnny Brown's crops were a sick-looking sight,
They were droopy, and weak, and grew but a mite.
While wise Carl Johnson's weren't sickly at all,
And some of them stretched near to seven feet tall!

One day, as young Brown was bemoanin' his lot,
And telling his friend how his crops went to pot,
Wise Johnson observed, "I'd say that they totter,
Because they're not getting enough growing water!

"Get USS National Polyethylene Pipe!
Irrigation with ease, keeps crops fresh and ripe.
A snap to install; it's so easy to do.
It goes around corners, and 'neath fences too!"

Young Johnny Brown took friend Johnson's advice,
And now his crops bring the top market price.
Production has climbed, and credit is laid
To National Pipe—NSF Grade!

Remember, USS National Polyethylene Pipe unrolls like a hose, resists acids, alkalies and rot, performs efficiently in a temperature range of −90°F. to +120°F., and won't crack or break in sub-zero weather.

National Polyethylene Pipe comes in lengths up to 400', in diameters from ½" to 6". And, it's made of 100% virgin polyethylene plastic to which 3% carbon black filler has been added to prevent deterioration from ultra-violet rays. Insert fittings in nylon and styrene copolymers (NSF) are now available from National Tube. For complete information, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. *USS and National are registered trademarks*

This seal of the National Sanitation Foundation means Tested ... Approved ... Sanitary!

nSf

USS National Polyethylene Pipe

"The world's largest and most experienced manufacturer of tubular products"

National Tube Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • United States Steel Export Company, New York

DAIRY BARN

(*Continued from page* 18)

worse by 28 pounds in a 305-day lactation if the herd size rose from 22 to 46 cows.

As the calving interval rose from 10 to 14 months, up went milk and fat production. Similarly the length of the dry period affected butterfat—which rose two pounds for each week increase in the dry period from three to nine weeks.

Feeding and Milking The two most effective influences in the Wisconsin studies were feeding and milking practices. With feeding it was simple—feed more TDN and get more milk.

Milking practices made more difference than this. Between two herds, one poorly milked, the other excellently milked, the difference could be as much as eight pounds of milk a day for a 305-day lactation.

Because the milking practices were so important, the university is continuing their study of the way different farmers milk, and how this affects yields. Their final object is a series of easy tests to determine the quality of milking procedure. The tests must be simple, depending on a measurement, not an estimate by the tester. If the tester's judgment is eliminated, the tests would be comparable all over the country, and herds could be accurately compared.

The Wisconsin researchers have a score sheet on milkers—the perfect man gets 100 points. The division of the various procedures of good milking are most interesting. The most important single item, they believe, is that the teat cups be removed promptly when milk flow stops. Next come four items of approximately equal importance. First, apply the machine between one and two minutes after beginning a warm-water udder massage; second, machine does not average more than four minutes on a cow; third, vacuum is according to manufacturers' recommendations; and fourth, that the massage before milking lasts at least half a minute.

These five items made up more than half of the points scored in the test. If you did these as they suggested, you are a "good" milker. (Poor scored up to 25, fair up to 50, good to 75, excellent up to 100.)

There were other items considered important. The five following added up to almost 25 points: Pulsation at recommended number per minute; all rubber parts clean and free from leaks; one man does not operate more than two units (includes carrying milk); heifers milked first and mastitis-infected cows last; and that the teats show no signs of irritation after machine removal.

If you had all these points perfect—and they are all simple—you are in the excellent milker class. There are still a dozen or so smaller points to make up the "perfect" score of 100. Being an excellent milker, according to the Wisconsin study, could make a difference of 800 to 2,400 pounds of milk per 305-day lactation.

Now to help you fight disease setbacks

NEW! Stress Feeds

Supplement your own cattle feeding program with trouble-shooting Terramycin

Your cattle are sure to undergo stress this spring, no matter where they are . . . in feedlot or on range or pasture. And whenever stress hits, your cattle are wide open to setbacks.* Use Stress Feeds at the first sign or suspicion of trouble—when changeable weather strikes . . . when temperatures drop fast . . . when cattle look unthrifty.

These new Stress Feeds with Terramycin were designed with you in mind . . . and for use on top of your own cattle feeding program.

Follow your feed manufacturer's recommendation whether he makes Stress Feeds in crumbles form, as mineral supplements, cubes, pellets or meal. The main idea is to get Terramycin into your animals fast to help prevent disease-caused stress setbacks.

Terramycin helps head off a wide range of organisms triggering respiratory infections that follow on the heels of bad weather and other stresses: Prevents and treats shipping fever and many other associated conditions which lead to terminal pneumonia and death.

If disease hits, Stress Feeds with Terramycin help you get fast action against scours (bacterial diarrhea, enteritis) that can hit hard after stress conditions.

Leading manufacturers now have Terramycin-fortified Stress Feeds. Use them in conjunction with your own feeding programs. But be sure to look for Terramycin (oxytetracycline) on the tag.

*due to diseases caused by Terramycin-susceptible organisms.

Pfizer

Chas. Pfizer & Co., Inc.
Brooklyn 6, N. Y.
Science for the world's well-being™

Stress Feeds with Terramycin®

BRAND OF OXYTETRACYCLINE

Big Six delivers 19 to 58 hp.*...

uses as little as 1.9 gallons of gas per hour

IH Multi-Range Sixes deliver record power... small tractor economy on light jobs

Now, enjoy the advantages of five power sizes in *one* big Farmall® or International® tractor. IH Multi-Range Sixes give you over seventy power-speed combinations. Now, you can duplicate the pull, and fuel consumption, of a 1, 2, 3, or 4-plow tractor with big 5-plow power. This gives you amazing *all-job* efficiency and economy!

Try this big difference in big tractors—IH Multi-Range power! Smooth, 6-cylinder engine gives you the widest governed range of any big tractor—600 to 1,800 rpm! This 1,200 rpm spread, plus 10 speeds forward, provides *exactly* the right pace and pull for every job. Now, you can do better work on less fuel. Besides, Farmall and International® Multi-Range Sixes give you unmatched comfort and convenience.

**Farmall 560, drawbar hp corrected to standard conditions.*

YOU'RE A BIGGER MAN WITH AN IH TRACTOR

Cut planting time and fuel costs up to one-third!

Pocket big Multi-Range savings with a 4-plow Farmall 460 on planting and other light jobs. Save up to one-third on fuel by shifting up and throttling back to a slower rpm. Work your present tools faster, or pull wider hitches. Farm at higher speeds. TA is always ready to take you across tough spots without shiftdowns.

Disk extra acres with "do-more" utility power!

Multi-Range power helps the 4-plow International 460 tractor shorten your workday as much as 1½ hours! You save time by *exactly* matching power to the load . . . by calling on Torque Amplifier for full-power turns, and non-stop work in tough going. And you can use TA drive all day without losing efficiency or wasting fuel.

Get unmatched savings with IH 6-plow Diesel!

Teaming more efficient Multi-Range power with lower-cost Diesel fuel gives the 6-plow International 660 Diesel amazing big-tractor efficiency and economy. Rugged IH Multi-Range Six, which starts direct on Diesel fuel, ends annoying hammering and roughness. All IH Multi-Range Sixes come with gasoline, Diesel, or LP gas engines.

Try a powerful IH tractor that handles both light and heavy jobs with new time and cash-saving efficiency. Ask your IH dealer to demonstrate this big difference in today's big tractor—IH Multi-Range power! And look to him for *all* your other power needs, too. Remember, only IH builds farm tractors in seven power sizes—10 to 85 hp!

INCOME PURCHASE PLAN
PAY AS YOU FARM

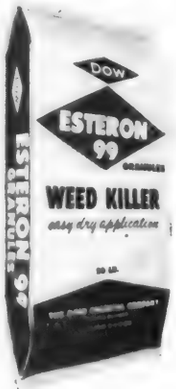
Use the IH Income Purchase Plan! Match payments to monthly or crop-year income to let your new IH tractor pay for itself in use. Take up to 36 months to pay!

INTERNATIONAL HARVESTER

International Harvester Products pay for themselves in use—Farm Tractors and Equipment . . . Twine . . . Industrial Tractors . . . Motor Trucks . . . Construction Equipment—General Office, Chicago 1, Illinois

DOW | **WEED AND GRASS KILLERS**

New GRANULAR ESTERON 99...



No water hauling . . . no mixing . . .
just apply it on corn ground—as you plant—
and control both seedling weeds and
seedling grasses

KURON®... for controlling emergent and submerged aquatic weeds and grasses in farm ponds or lakes. Application not harmful to fish, but recommended only on still waters. Kuron is also effective for killing unwanted brush, especially oak and maple!

PREMERGE® ... eliminates the need for early cultivations. Band treatment especially effective in row crops such as potatoes, sweet corn, soybeans, peanuts, lima beans, snap beans, field beans. Cheaper than cultivation or other pre-emergence weed killers. To save time and get better results, "cultivate" the day you plant—with Premerge!

DOWPON® ... the systemic grass killer. Apply before planting or as a spot treatment to control quack grass and Johnson grass. Also use selectively in flax, sugar beets, sugar cane to control seedling grasses such as pigeon or foxtail grass, water or barnyard grass, wild oats. Excellent for killing cattails. One application often gives up to 95% control!

America's leading weed killer now in easy-to-use form

Here's the biggest news for corn growers since the development of chemical weed killers! Esteron 99®, America's leading brand of 2,4-D, is now available in granular form for pre-emergence control of weed and grass seedlings in corn!

Saves time! Esteron 99 Granules eliminate the rush and worry of early wet-weather cultivating. You can use the time for other farm jobs. There's no water to pump or haul, no measuring or mixing, and no waste! Esteron 99 Granules go direct from bag to equipment—you use only what you need!

No sprayer problems, clogged nozzles, broken hoses, pump problems or boom adjustments. And there's no messy clean-up of equipment. Apply Esteron 99 Granules by converting your present soil insecticide equipment. Or get new equipment—designed for the job—for far less than you'd pay for spray equipment!

Best of all, you get the same effective weed control that has made Esteron 99 America's favorite. Tough weeds like lamb's-quarter, pigweed, mustard, wild radish; grasses like foxtail grass, barnyard grass and many others, can be controlled with one early application of Esteron 99 Granules.

If you farm in the Midwestern corn belt, see your Dow dealer for your supply of Esteron 99 Granules. In all other areas, ask your Dow dealer about the full line of other Dow herbicides for weed, brush and grass control. Or write THE DOW CHEMICAL COMPANY, Agricultural Chemicals Sales Department, Midland, Michigan.

THE DOW CHEMICAL COMPANY · MIDLAND, MICHIGAN

BUTLER STOR-N-DRY CENTERS®... *WITH AUTOMATIC UNLOADING*

Dry, store, handle a big multi-crop harvest safely, efficiently, at a low cost-per-bushel

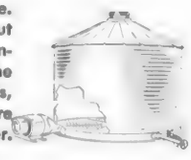
Last year, thousands of grain farmers turned to new drying and storing equipment and methods, to increase efficiency and farming profits. John Hoff, at Booneville, Missouri, for example, decided to harvest early and dry and store his own grain. Hoff knew this would enable him to harvest 10% to 15% more grain, make his chores easier and let him hold his grain crop for higher, more profitable market prices.

The Butler Stor-N-Dry center with automatic unloading (shown above) was the answer for his harvesting and marketing plans. The center's matched equipment provided safe, positive drying action. It matched his rate of harvest . . . handled 21,000 bushels of grain . . . and stored it, too.

John Hoff dried milo from 19% to 12%, corn from 18% to 13%, and soybeans, all at an average cost of only 3¢ per bushel. The Butler automatic unloader gave him a completely mechanized grain handling system, and the bin provided the added storage capacity needed.

Stor-N-Dry centers are available to match the drawing rates and storage needs of farmers harvesting a few thousand bushels of grain, as well as those who harvest many thousands of bushels. For full details on Stor-N-Dry centers, see your nearby Butler Blue Ribbon Dealer. Or, write direct for free booklet, "On-farm Drying Pays—Every Year."

Everything you need in one complete package. Butler Stor-N-Dry centers take the guesswork out of choosing the right equipment. Everything, including the storage bin, the perforated floor, the fan, the wide range heater, the automatic controls, the grain loader and the automatic unloader are all designed and built to work perfectly together.



BUTLER®

BUTLER MANUFACTURING COMPANY

Dept. 378, P. O. 7027, 1020 East 63rd Street, Kansas City 13, Missouri
978A Sixth Avenue, S.E., Minneapolis 14, Minnesota
921 Avenue W, Ensley, Birmingham 8, Alabama
Dept. 78A, 2710 Butler Avenue, Richmond 1, California

Manufacturers of Equipment for Farming, Oil Transportation, Outdoor Advertising • Metal Buildings • Contract Manufacturing
Factories at Kansas City, Missouri • Minneapolis, Minnesota • Galesburg, Illinois • Richmond, California • Birmingham, Alabama • Houston, Texas • Burlington, Ontario, Canada

BIG STICK MAKES YOU THE BOSS

Farmers who've tried other tractors can speak with authority. We asked 553 new owners, among the thousands who switched to Allis-Chalmers tractors the past year, what features they liked best.

Their answers tell you what's really new in tractors today.

No. 1 feature: Allis-Chalmers Power Director—the "Big Stick." One easy-shift lever controls 8 smoothly graduated speeds ahead in 2 ranges. Rugged oil clutch eases through tough spots with live PTO—or gives an instant surge of power when it's needed. Makes *you* the master—whatever the crop or soil.

Power Director teamed with TRACTION BOOSTER system (now with *new wider range*) matches power, speeds and automatic traction to every load.

Take a Dynamic D into the field. Test new Power Steering*... solid-comfort seat... step-on platform... SNAP-COUPLER hitch. Begin a new decade of productive farming—easier too—for you!

*Optional on D-14 and D-17 Models.

'60's-new dynamic D's have it!

TRACTION BOOSTER and SNAP-COUPLER are Allis-Chalmers trademarks.

ALLIS-CHALMERS, FARM EQUIPMENT DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

Ask your dealer about the Allis-Chalmers plan to finance your time purchase of farm equipment.

GRADE "A" MONEYSAVERS...

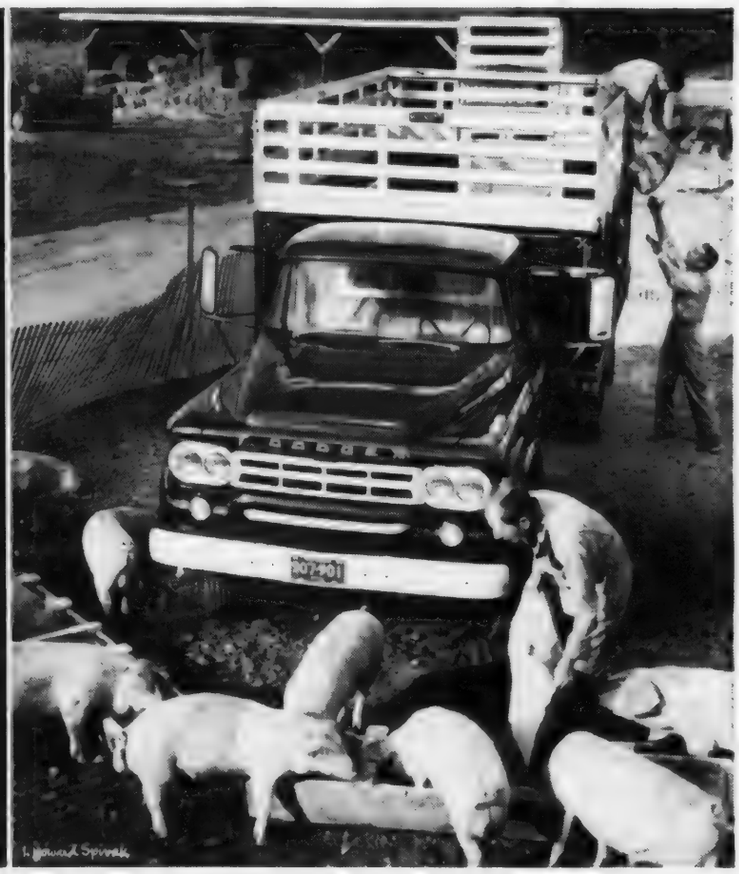
Look for a big drop in costs when you buy one of these all-new Dodge trucks. They're engineered to out-save any other haulers on the road! Here's a new fleet-wheeled Sweptline with more load space (up to 84 cu. ft.) than any pick-up in its class . . . and the power to pull a full load through the soggiest feedlots or snowiest fields. There behind it is a new Dodge stake, yours with a wheelbase up to 193"; a 9′, 12′ or 14′ body; and an engine as big as 202 hp. to tailor it to your kind of hauling. You'll like *all* the great 1960 Dodge trucks (4,250-lb. G.V.W. light-duty models to 76,800-lb. G.C.W. giants)—*premium in every way except price!* See them at your Dodge dealer's today!

DEPEND ON DODGE TO SAVE YOU MONEY IN TRUCKS

A PRODUCT OF CHRYSLER CORPORATION

"HAULING OR HARVESTING, WE MAKE EVERY MINUTE PAY OFF WITH OUR EATON 2-SPEED AXLE"

—SAYS SWINE BREEDER ROBERT H. BLANFORD MONTROSE, MICHIGAN



"We raise about 3000 head of pure bred landrace and hybrid hogs yearly, and grow corn, oats and wheat for feed," says Mr. Blanford. "There's plenty of hauling in our operation. We truck our hogs to market, haul our grain to the elevators, and deliver our breeding stock to purchasers near and far—all with our '59 two-ton Dodge equipped with an Eaton 2-Speed Axle.

"We bought an Eaton 2-Speed because it pulls us out of tough spots far better than any conventional axle could. Eaton's low-gear range gives us the extra pulling power we need to get us through with capacity loads—no matter how soft or how hilly the ground. When we're harvesting corn, that low-gear range lets the truck work right along with the combine at a smooth, steady two miles an hour. We could never do that with a single-speed axle.

"At harvest time, speed means profit. We've got to get to the grain elevators fast. That's when we count on Eaton's high-gear range to maintain maximum legal speeds on the highways, even with a fully-loaded truck. We shorten delivery time by 20%, save plenty of money that way."

Discover the advantages of an Eaton 2-Speed Axle for yourself. Ask your truck dealer for a demonstration today.

DODGE DEALER Bob Howell of Bob Howell, Inc., Saginaw, Michigan, says, "I sell at least 50 Eaton-equipped trucks a year. Nothing beats them for versatility, economy and higher trade-in value. That's what I tell my prospective customers. And that's what they tell *me*, once they've seen first-hand what an Eaton 2-Speed can do."

"OPERATING COSTS ARE LOWER with an Eaton 2-Speed Axle," adds Mr. Blanford. "Eaton's high-gear range reduces engine RPM—gives more miles to the gallon, saves us at least 10% in fuel costs. As for repair expense—there's practically none. That's because the Eaton is easier on the engine and other power-transmitting units; cuts down on wear and tear."

EATON MORE THAN 2 MILLION EATON AXLES IN TRUCKS TODAY

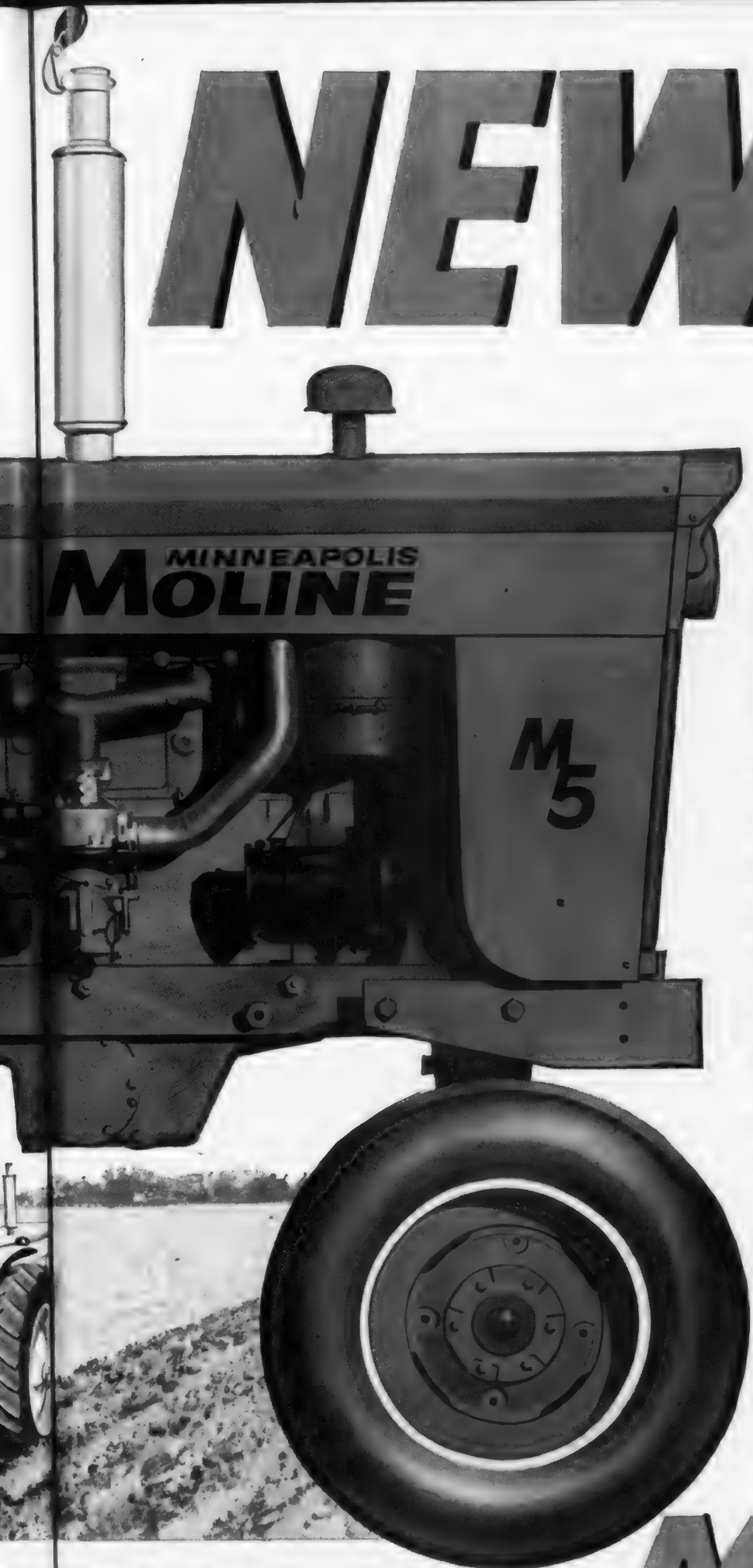
2-SPEED TRUCK AXLES

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

MOLINE'S

FIRST IN FARM

NEW M-5



Built to bring you real 5-plow power

We started with a plan: to build the toughest, heftiest, handiest row-crop tractor you ever drove. That's how the Moline M-5 began.

We planned the M-5 for the heft and drawbar muscle to pull the biggest implements in common use—with the versatility and easy handling you need for row-crop work.

We built the M-5 to a new standard of toughness and endurance. An entire pilot series of these tractors went through the test racks to develop that toughness. You can see the results in every inch of this brawny powerhouse.

We made the M-5 the first tractor scientifically designed for day-long driver comfort.

But most of all, we built the Moline M-5 for POWER.

HORSEPOWER—with a mighty 336 cubic inch Moline-built engine that delivers 78 h.p. at the flywheel (Gasoline and LP gas models). Diesel also available.

PULL-POWER—with engine-matched power train and 10 speed Ampli-Torc Drive to double pull-power on-the-go.

HYDRAULIC POWER—for touch control of 3-point, front mounted or drawbar implements . . . for power steering.

WORK-POWER—with independent power take-off driven straight from the crankshaft . . . standard hydraulics . . . or the most advanced 3-point hitch you can buy.

But get a first-hand view of the tractor that's making farm power history! See and drive the M-5 tractor at your Moline Dealer's now!

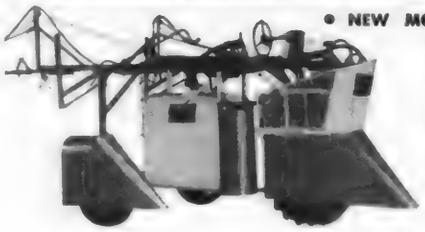
**Moline Dealers give the Best Parts Service in the Industry*

M ENGINEERING

MINNEAPOLIS MOLINE

STEP UP CORN YIELDS 25%

WITH THE NEW 1960 HAHN HI-BOY®



• **NEW MODEL H-300.** 30 h.p. 4-cylinder Wisconsin engine; "live" pump drive assures instant spray pattern; aluminized-steel 8-row boom and 200-gal. tank; all-new frame with yoke rear wheels and 7.50 x 20 tires for added stability; new full-slope fenders (optional). New E-Z-Boy steering gives 60% greater steering ease. New E-Z-Ride comfort seat. Also available with 24 h.p. Kohler engine (Model H-240).

HAHN HI-BOY can increase your corn yields as much as 10% through weed control alone . . . and up to 15% more through corn borer control. At $1 per bushel, this can mean as much as $2,000 extra profit per 100 acres! Only HI-BOY can give you such complete weed and insect control — proved by 11 straight years of actual on-the-farm experience.

SPECIALLY DESIGNED FOR LIQUID FERTILIZER APPLICATION . . .
4-ROW TOPPER ATTACHMENT AVAILABLE!

Many other applications including pre-emergence insect and weed control, brush control, cattle spraying, and thorough spraying of *all* crops. Hahn spraying specialists will be glad to help you *step up* to the best program for all your crops, advising you what chemicals to use and how to use them. Send coupon now.

9 NEW 1960 MODELS . . .
a size and price for every need!

LEFT: NEW LOW-PRICED MODEL H-180. 18 h.p. Wisconsin engine; "live" pump drive; hand clutch; aluminized-steel 8-row boom and 150-gal. tank. Provides low-cost economical spraying for any size farm. Outperforms most other and higher-priced machines in its field.

AGAIN . . . IN 1959, more farmers bought Hahn Hi-Boy than all other makes combined!

FREMA SEAL OF QUALITY

HAHN HI-BOY
THE HI-SPEED SPRAYER

HAHN, INC. Dept. Q-10, Evansville, Ind. • Phone: HA 4-0931

Send me my personal copy of the new 1960 Hahn Sprayers Buying Guide. Also send me latest data on spraying advances for crops checked:

☐ Corn ☐ Soybeans ☐ Vegetables ☐ Small Grain

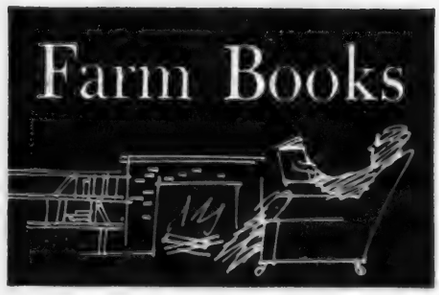
(List others here).....

Name.....

Address.....

.....

Farm Books



***The Great Farm Problem,** by William H. Peterson. Henry Regnery Company, Chicago, $5.00.*

The farm problem can be reduced to one word says Professor Peterson—intervention, defined as "governmental interference with the market forces of supply and demand."

His argument is summed up in the following capsule: "The farm problem is political and could be labeled 'made in Washington'; the problem lies in the politics enmeshing the farmer, his prices, his surpluses. These surpluses include . . . farmers."

Peterson, who is associate professor of economics at New York University, has built a compelling case for his thesis. But his chief weakness is an advanced case of metropolitan myopia.

He traces the growth of intervention from pre-Revolutionary days to 1959 and in true urban fashion blames it all on "agrarianism." And what is agrarianism? "In a word," he says, "it was *land*—love of the land, of life on the land, of a livelihood from the land, of a favorable public policy directed toward the land."

This "love of the land" gets the blame for cheap money, the tariff, the Civil War, the loss of states' rights, and practically every other abomination that ever struck us.

Efficiency, of course, draws the usual hosannas, but what is efficiency? The definition is completely ignored, as it always is by those staunch defenders of the capitalistic system who unhesitatingly surrender the very ground on which they stand by rejecting all motives and determinates of human activity except the economic.

One of the definitions Webster gives for efficiency is the "capacity to produce desired results by a calculated adjustment of means to an end." It seems never to occur to these people that results other than the mere production of food and fiber are to be desired of the rural sector of the nation. Nor are they bothered by the fact that the concentration of land and the management of wealth into fewer and fewer hands with the accompanying build-up of a rootless, irresponsible, dispossessed class simply sets the stage for a totalitarian take-over.

While one may be in complete sympathy with Professor Peterson's earnest desire to get the government out of farming and other activities, his pronouncements on surplus farmers are a complete understatement. In the world which the cult of efficiency envisions it is not only the small farmer but man himself who is surplus.

C.R.K.

WITH YOUR OWN SAFE, FAST, ECONOMICAL PIPER

It's So Easy to Get Around!

Farmers and ranchers who use their own easy-to-fly Pipers enjoy a complete new sense of travel freedom, gain much valuable time by making trips in minutes, not hours.

You, too, will find a Piper provides fast, dependable, convenient transportation whatever your destination . . . livestock auction, the big city's shops, faraway vacation spots, or chasing urgently needed parts. You'll find it's so easy to get around when you fly . . . and so much fun, too! Distant friends become neighbors.

The modern Piper line gives you a wide choice in the selection of the plane best suited to your individual travel needs.

The family arriving here flew in at three miles a minute in their Piper Comanche — all-metal, low-wing, high performance beauty that is without a doubt the most admired airplane in its class.

Other Pipers include the popular, economical 4-passenger Tri-Pacer and Caribbean; the 2-place Super Cub, world renowned for unlimited utility; the new Pawnee agricultural plane; the two luxurious Piper "twins," the Apache and the Aztec.

Each is a distinctive, super reliable piece of machinery, and all share the safe, stable, easy-to-fly characteristics for which Piper is famous. NOW, IN 1960 . . . adding a new dimension in safety and flying ease . . . exclusive Piper AutoControl, automatic flight system, is available as standard equipment in AutoFlite models of the Aztec, Apache, Comanche and Tri-Pacer.

You are cordially invited to see and fly these modern Pipers at your local Piper dealer's. For a preview in print, send today for the new, full-color brochures.

PIPER BUILDS A PERFECT PLANE FOR EVERY FARM AND RANCH PURPOSE

PIPER AZTEC — new, over-200-mph twin-engine executive transport. Carries 5 in roomy luxury. Advanced design assures outstanding performance, gives Aztec highest single-engine ceiling of any plane in its class carrying similar payload.

PIPER APACHE — world's most popular executive twin, with 171 mph cruising speed, range to 1,260 miles. Available in 4- and 5-passenger versions. Priced far below any comparable new twin. Apache recently flew 1,304 miles with right propeller removed.

PIPER COMANCHE — low-wing, all-metal high performance plane, available with choice of Lycoming 250 or 180 hp engine. Comanche holds world's lightplane distance record — 7,668 miles, non-stop from Africa to Los Angeles. Unmatched for efficiency.

PIPER TRI-PACER with 160 hp Lycoming carries four, combines most features to simplify flying. New optional speed fairings boost cruise speed to 138 mph. 150 hp Caribbean model is lowest priced four-place plane available. Safe, fast – ideal for beginners.

PIPER SUPER CUB—rugged 2-place "aerial jeep," safely operated from short, rough fields and at high altitudes. Ideal for livestock and crop survey, fast hauling of supplies. Available with choice of 150 hp Lycoming or 90 hp Continental engine.

PIPER PAWNEE — revolutionary new agricultural plane, designed specifically for aerial application of liquid and solid chemicals. Pilot safety, dispersal efficiency, and operating economy are all features of Pawnee, now in volume production.

BACKYARD CONVENIENCE

Hundreds of farm and ranch owners of Piper planes find that they can operate with safety and great convenience from landing strips on their own property. Any strip 100-200 feet wide and 1500 to 2000 feet long with clear approaches provides adequate room. Or you can use the facilities of a nearby community airport.

PIPER AIRCRAFT CORPORATION
Lock Haven, Pennsylvania

Please send me literature on:

- ☐ Piper Aztec
- ☐ Piper Apache
- ☐ Piper Tri-Pacer
- ☐ Piper AutoControl
- ☐ Piper Comanche
- ☐ Piper Super Cub
- ☐ Piper Pawnee
- ☐ "Learn to Fly" Programs
- ☐ All Piper Aircraft

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MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD

Meet McCulloch's New **NUMBER ONE** Saws

ON THE JOB!

Torture Tests Prove It!

You can be sure a new McCulloch *Number One* chain saw will stay on the job day after day, year after year – no matter how tough the cutting.

McCulloch *Number One* dependability was proved by the most brutal chain saw torture tests ever devised. The inset photograph shows one of the many endurance tests McCulloch *Number One* saws had to pass. After more than 500 hours of continuous operation in the torture chamber the *Number One* saw was still going strong.

The *Number Ones* were proved by torture test – then proved again and again in the woods and on the farm by hundreds of chain saw users throughout the country.

Try a new McCulloch *Number One* chain saw at your dealer first chance you get. Seven models to choose from.

ONE/40 Direct-Drive

Only McCulloch gives you so much saw for so little money:
• Weighs only 18 pounds • Lubri-Mac Automatic Oiling
• Direct-drive for fast, light-touch cutting • 3 bar sizes – 12, 18, 24" • Big 2.5 pint fuel tank • Pintail Chain
• As low as **$154.95**

LEADERSHIP THROUGH CREATIVE ENGINEERING

McCULLOCH CHAIN SAWS

Number One In World Sales

For free booklet write McCulloch Corporation, Los Angeles 45, Calif., Dept. FQ

McCulloch Corporation, Los Angeles 45, Calif. • Marine Products Division (Scott Outboards), Minneapolis, Minn.
McCulloch of Canada, Ltd., Toronto, Canada • McCulloch International Inc., Los Angeles 45, Calif.

• 5-90228

WHICH farm-truck saving means most to you?

☐ $35 TO $161
SAVING ON PRICE

☐ 25% MORE
MILES PER GALLON

☐ TWICE
THE TIRE LIFE

You get 'em ALL in a

1960 FORD PICKUP

(and that's for sure — they're certified!)

CERTIFIED LOWEST PRICE!

You'd never know by the load, the ride or the look of it. But the fact is *certified:* the new 1960 Ford is the lowest priced pickup of any leading make!*

You save from $35 to $161 on half-tonners, even more on bigger models. 1960 Fords are priced below all other farm trucks!

*Based on a comparison of latest available manufacturers' suggested retail delivered prices, including Federal excise tax, excluding dealer preparation, conditioning and destination charges.

CERTIFIED GAS SAVINGS!

There's no guess about gas in a '60 Ford! Tests conducted by independent engineers† certify the fuel economy of Ford's modern six-cylinder engine.

This is the gas-saver that beat all other makes in Economy Showdown U.S.A. The engine that registered over 25% more miles per gallon than the average of *all* competitive Sixes in all kinds of driving. Come in and try it!

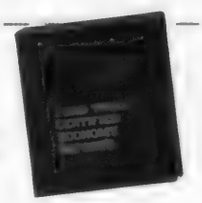
†Names on request. Ask your Ford Dealer.

CERTIFIED TIRE SAVINGS!

Compared with some new pickups, a 1960 Ford can save as much as $300 on front tires alone over its life. Startling, yes!—and here's why it's true.

Tough Ford pickups have a true truck front wheel suspension—the type used on heavy-duty trucks. Result: tires lasted over *twice as long* in certified tests. Over twice as long as the same tires on pickups now using a "soft-type" suspension!

See the record, size up the savings! All these test results—and many more—are in your Ford Dealer's "Certified Economy Book." Come in! Get the certified facts on 1960 Ford truck prices, gas economy, and durability. You'll come out ahead!



FORD TRUCKS COST LESS

LESS TO BUY... LESS TO RUN... BUILT TO LAST LONGER, TOO!

Report to Farmers on 1959 Corn Yields

REMARKABLE INCIDENT—NOT ACCIDENT

Records show some mighty high individual corn yields over the years which have received well-deserved honors. Of greater significance, however, are high average corn yields made NOT by ONE, but by THOUSANDS of farmers over a widespread area. Here, many types of soils, management and weather enter the picture. This is the true test of a corn's ability, its bred-in ability to come through under widely varying conditions. A remarkable record has been compiled in the 21 years of National Selected 5-acre DeKalb Corn Growing Contests.

A GREAT BIG AVERAGE

1959 was a good year for corn. Yields were generally good. Most yields in DeKalb's National Contest were great. With 5,771 farmers participating in this nation-wide yield-power demonstration, an overall average of 109.8 bus. per acre* was achieved.

MAKES IT 4 IN A ROW

After recording the highest yields in South Dakota for 4 years in a row, a Father and Son team produced the highest official contest yield in the country. Henry Carlson and Son of Spearfish, in Lawrence County, grew 204.66 bus. per acre* in their irrigated field of DeKalb 409.

CHAMPS REALLY "KNOW THEIR STUFF"

We've got to go from Dakota to Kentucky to find our National Reserve Champ. He's Charles Brooks of Allensville, who produced 194.95 bus. per acre* with DeKalb 852. Then up to Danville, New York where William G. Carney grew 192.9 bus. per acre* with DeKalb 222 for 3rd place honors. Our 4th place winner, Ruben Schissler, farms near LaSalle, Colorado. He produced 189.68 bus.* with DeKalb 409. Champions from Illinois, Iowa, Ohio and Nebraska all achieved yields over 180 bushels per acre*. The average of all state champions, including the Canadian Champ, was over 153 bushels per acre*.

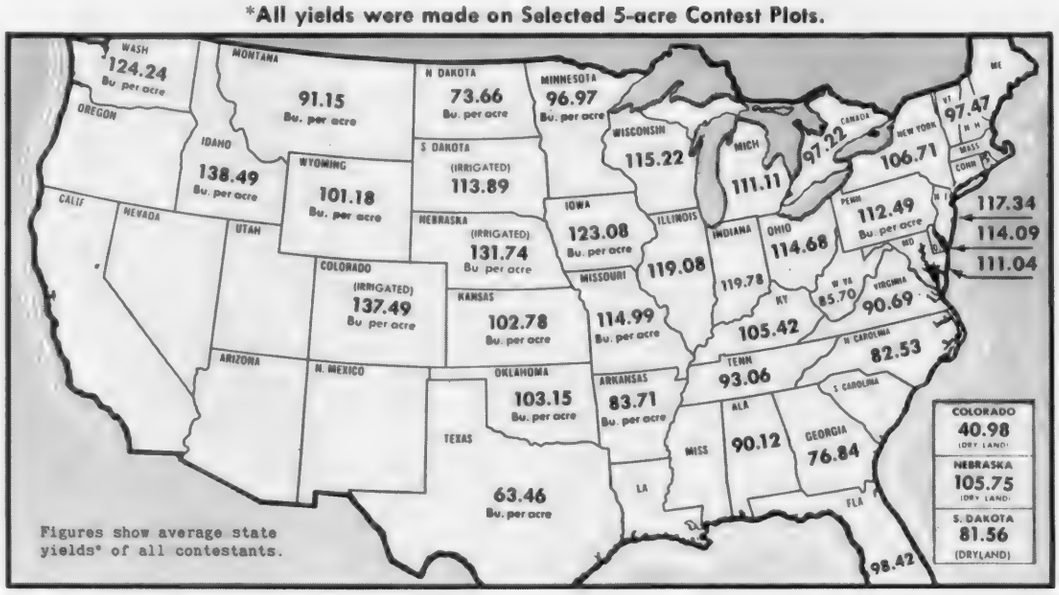
THIS "TOPS 'EM ALL"

For 20 straight years, MORE farmers have planted DEKALB than ANY OTHER CORN. DeKalb scientific breeding... DeKalb quality...DeKalb "Know-how" must be the reasons why DeKalb is so different. See for yourself in 1960.

RESEARCH PAVES THE WAY

DeKalb Seed Corn Research gives DeKalb corn its "yield-power." DeKalb's test fields can be found just about everywhere. This is why key DeKalb varieties have such honorable records. Order and plant DeKalb...the corn of CHAMPIONS.

***All yields were made on Selected 5-acre Contest Plots.**



The above figures have been audited and to the best of our knowledge are correct as of December 30, 1959.

DEKALB AGRICULTURAL ASSOCIATION, INC., DEKALB, ILLINOIS

Commercial Producers and Distributors of DeKalb Seed Corn, DeKalb Chix and DeKalb Hybrid Sorghum

Startling Facts About Fertility

SUDBURY, MASS. — The fertility of the soil is being carted away right under the American farmer's nose. Every 100 bushels of corn he harvests takes out of his soil 100 lbs. of nitrogen, 50 lbs. of phosphorus and 80 to 120 lbs. of potassium.

It takes 125 lbs. of superphosphate and 25 lbs. of muriate of potash per acre to replace what 40 bushels of wheat consume.

Surveys show crops are taking twice as much nitrogen out of the soil as is being replaced by fertilizer and manures, where farmers don't follow soil tests. So says H. J. Atkinson, director of Sudbury Laboratory, world's largest makers of Soil Test Kits.

With every 5000 lbs. of milk leaving the farm goes another 50 lbs. of nitro... From an acre of alfalfa... ttle consume soil to 250 lbs. of 5 lbs. of muriate ... s. of limestone. ...ore phosphate

Get Bigger and Better Crops

Make More Money From Every Acre You Farm

TEST YOUR SOIL FREE

THE DO-IT-YOURSELF WAY

Up to 200 Bu. Corn per acre • 100 Bu. Wheat
30 Tons Tomatoes • 750 Bu. Potatoes
5 Tons Hay • Up to 300% Increase in Milk

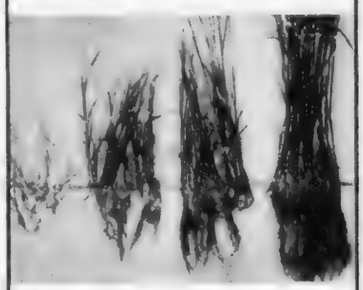
THE BIG PROFIT IS IN THE EXTRA BUSHELS OR TONS

No one needs to tell YOU what a big share of any crop it takes to get back your costs! There's no profit in the first 40 bu. of corn per acre; the extra bushels make the money.

Double Your Yield—Cut Costs Way Down!

Extra yield, whether crop prices go up or down, can make 1960 the most profitable year you ever had. The first and most important step is to test your soil in every field! Don't use fertilizer "by guess and by golly". The cost of your Soil Test Kit is deductible farm expense on your income tax.

The right fertilizer, guided by soil tests, produced in a well-known state agricultural experiment station plot the bumper corn yield in bin at right.



A leading ag college increased wheat yield ten-fold with proper fertilizer. Note vigorous root system and heavy top growth of properly fed clump at right.

Make Every Dollar Spent on Fertilizer Bring Back $10.00 or More

Yes, you can make every dollar spent for fertilizer come back as much as ten-fold, in bigger and better crops. Earn five times as much per acre as the average farmer does! You'll produce record yields, and actually build up your soil for years to come instead of draining its vitality. The right fertilizer, and the Soil Test Kit to guide you, increases your farm's value by boosting the "growing power" of your land.

Save Money on Fertilizer

"Guessing" wastes both time and money. No one knows what's in your soil or what last year's crops took out, without testing. You'll waste money if you use more fertilizer than the land needs. You take heavy losses in income if you don't use enough. Using the wrong kind can do more harm than none at all. Don't take a chance — take a test!

500,000 Users Can't Be Wrong!

L.K., Nebraska—"Tried 16 years to grow a 100-lb. watermelon. This year with soil test kit, 13 weigh 100 to 114 lbs., many up to 90 lbs. Heavy yield on tomatoes and cucumbers."
F.M.G., Ohio—"saved $114 on fertilizer, increased yields by $1500."
A.D., Indiana—"nearly doubled corn yield by testing the soil. Also got 30% more wheat and soy beans per acre."
T.B., Kansas—"got best looking corn crop ever. The kit is going to make me over $1500."
H.W.B., Michigan—"have been able to test when soil is right, and spot check field. Saved several hundred dollars."
J.I.I., California—"saved $1000 by knowing what fertilizer to use and how much."
A.H., Ohio—"sugar content of grapes was higher using kit, got higher price for crop."
L.S., Iowa—"increased my corn and oats yield by 500 bu. Now I know how much plant food I need, can increase my corn acreage by 30%."

Farmers Lifetime Soil Test Kit

Complete with everything for hundreds of tests. So reliable county agents, vo-ag teachers, ag colleges, extension workers, and successful farmers everywhere depend on it. So simple a teen-ager can use it professionally. Shows right amounts of nitrogen, phosphate and potash for each field. Also whether lime is needed (pH) and how much. That means bulging cribs, fuller barns, fatter cattle, bigger bank balances.

Lifetime welded steel chest with carrying handle, weighs only 12½ lbs. Easy instructions show needs of 225 different crops. Pays for itself several times over, even the first day you use it! Same low price as seven years ago, only **$29.95.**

Easy as Reading A Thermometer

NO KNOWLEDGE OF CHEMISTRY NEEDED

Even your first tests will be accurate and reliable. Ready to use anytime, anywhere — you can take your Sudbury Soil Test Kit right out in the fields and test as you go! No packing up samples to mail, no waiting for reports. You get your answers right away — the proper fertilizer and how much lime to use for every crop and every field. You'll use it every season, as long as you farm! **Takes Only 10 Minutes, Costs Less Than 10¢ a Test.**

Better Crops Guarantee

You Take No Risk — even next fall if you don't get bigger, better crops with your Soil Test Kit, send it back and we'll return your money. **That's the Sudbury Daring Guarantee!**

FREE TRIAL

When your Sudbury Soil Test Kit arrives, use it for 10 days, make several tests. If you're not delighted and don't agree it's a wise investment, send it back and we'll return your money so the tests you made will cost nothing!

CUT OUT AND MAIL TODAY

SEND NO MONEY

We'll mail C.O.D. plus postage. Or send check and we'll pay postage, saving you from $1.91 to $3.55 in postal charges. **Money-Back Guarantee.**

EASY PAYMENTS IF DESIRED

FREE BOOK

If you send check, we'll also include the valuable 64-page book on farm management, "Our Land and Its Care" **FREE!**

Hardware Stores, Fertilizer Dealers, Farm Supply Stores
Serve Your Customers by Carrying This Essential Aid to Better Farming.

SUDBURY LABORATORY Soil Test Kits

Box 48S, Sudbury, Mass.

THE WORLD'S LARGEST MAKERS OF SOIL TEST KITS . . . OVER HALF A MILLION NOW IN USE!

SUDBURY LABORATORY, Box 48S, Sudbury, Mass.
Attention: H. J. Atkinson, Director

Send me the Farmers deLuxe Sudbury Soil Test Kit at the special low price marked below:

☐ Enclosed is $29.95; send postpaid; include free book, "Our Land and Its Care."

☐ Send C.O.D. only $29.95 plus postage.

Name .....

R.D. or St. .....

P.O. ..... Zone ..... State .....

☐ Send on Easy-Payment Plan—I'll pay mailman $4.95 plus postage, then 4 monthly payments of $6.75 each.

The Monsanto Chemical Company has bought this advertising space in order to expose a problem which has developed in the field of chemical weed killers... a problem which can be solved only by giving you a better understanding of exactly *what* you are buying. If you expect *full value* for your weed-killing dollar, you'll want to read this article carefully.

When you buy weed killer, are you paying for the

2,4-D prices often mislead farmers into buying less "kill" for the money. Here's what you should know in order to get the most for your dollars this spring.

Killing weeds is big business... about 10 million gallons of 2,4-D are bought and used each year. It is formulated and sold by several hundred different companies... large and small... who compete with each other for your dollars.

2,4-D can be formulated in many different ways. This has led to some unusual pricing policies. Unfortunately, some pricing can take advantage of the man who is too busy to read the fine print on the 2,4-D can. Here's why:

All 2,4-D weed killers contain various chemical forms of 2,4-D acid (amines, low-volatile esters, regular esters, etc.). But, the only true measure of killing power is the actual 2,4-D acid content in the can. Good weed killers also contain emulsifiers for mixing with water and oil... sequestering agents for better mixing in hard or soft water... and spreader-stickers that make the mixed spray penetrate better into weeds.

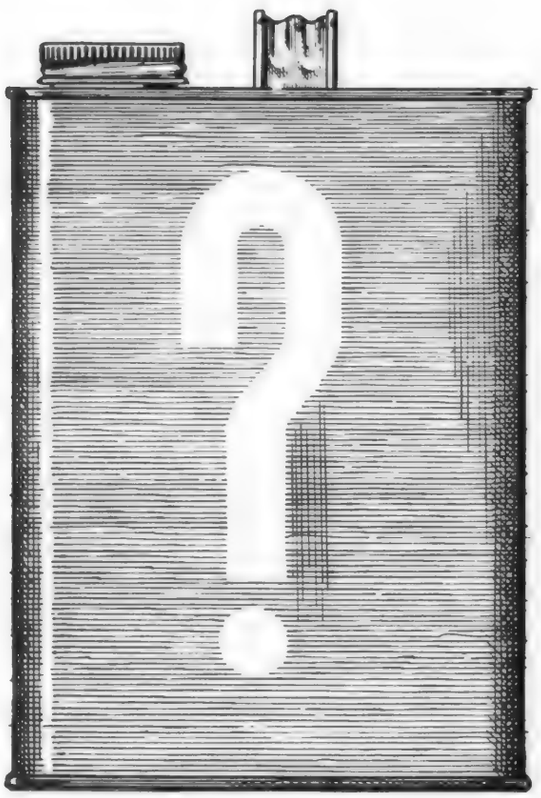
Since the 2,4-D acid content is really the measure of *killing* power, it is the most important factor in the price per gallon.

The amount of acid equivalent—or acid content—must be labeled on the can as required by law. Usually, it is given in terms of pounds per gallon. Thus, a weed killer may contain anywhere from 2 lbs. to 6 lbs. of 2,4-D acid equivalent per gallon.

Since rates of application are always based on pounds of "acid" applied per acre, the amount of acid content per gallon determines how much ground one gallon will cover. For example, at the application rate of ¼ lb. per acre, a two-pound gallon of 2,4-D will spray 8 acres, a four-pound gallon will spray 16 acres, and a six-pound gallon will spray 24 acres... even though each comes out of the same-sized can! It's easy to see how the man who compares prices per gallon instead of *acid content per gallon* can be misled into paying more, but buying less.

Let's review the pricing history of 2,4-D. Originally, some manufacturers made a 3.34-lb. gallon that now retails for, say $4.50. Then, some other manufacturer, in order to underprice his competitor, made

"kill" or the can



a gallon that contained only 2.67 lbs. of acid. Maybe his price was $4.00 per gallon. This kept up, until today the actual acid content in some weed killers is diluted down to as little as 2 lbs. per gallon. As the acid content drops, the price *cannot* drop in direct proportion.

Here's a simple example: Let's assume that you pay $4.00 for a 2-pound gallon (or $2.00 per pound of actual 2,4-D acid in the can). A 4-pound gallon may sell for $5.00 per gallon (or $1.25 per pound of 2,4-D acid). When you buy the 2-pound formulation, you pay *nearly twice as much* for the actual killing power in the can!

Now, this year Monsanto introduces a new 6-pound gallon that costs even less *per pound of acid* than a 4-pound gallon. What does this mean to you? Dollar for dollar, Monsanto's new SUPER-6-CONCENTRATES offer you the most weed-killing power for your money.

What the "price buyer" seldom realizes is that he has to buy *three* cans of the 2-lb. formulation to cover the same acreage as one can of the 6-lb. weed killer. He's paying the manufacturer's cost of two extra cans, filling two extra cans, handling two extra cans . . . and shipping two extra cans. In other words, he's paying for the cans instead of the kill.

For competitive reasons, every manufacturer of 2,4-D sells these weaker-strength formulations. However, Monsanto Chemical Company now offers the business-minded buyer high-analysis 2,4-D and 2,4,5-T products. These SUPER-6-CONCENTRATES contain 6 pounds of acid equivalent per gallon, and therefore offer the farmer *a true bargain* for his weed-killing dollar.

Tear out these pages and take them to your dealer. Make sure you get the most weed-killing power for your money.

Farmers, distributors, dealers and professional agricultural workers are invited to write for further information, or for reprints of this advertisement.

MONSANTO CHEMICAL CO.
Organic Chemicals Division
Agricultural Chemicals Department
St. Louis 66, Mo.

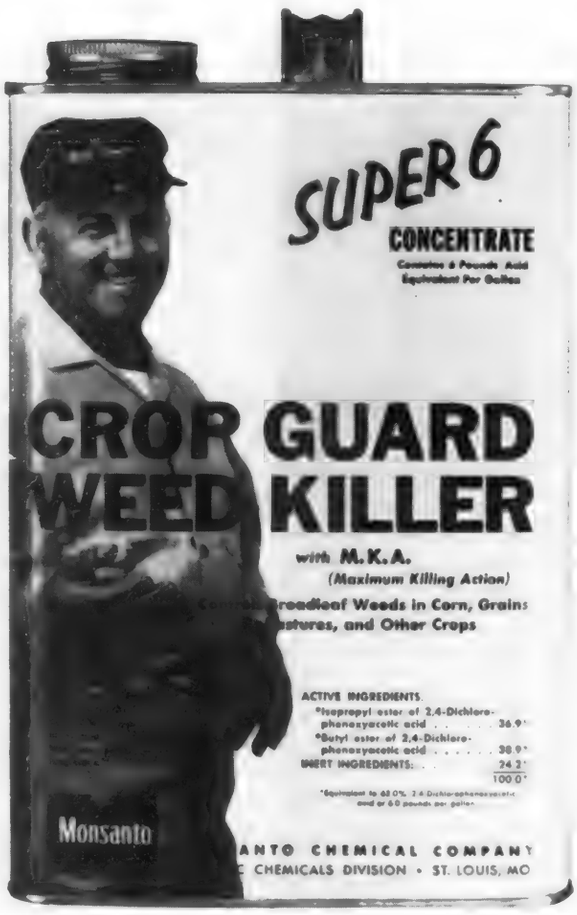
Monsanto

Monsanto

super-6 concentrates

Here are your new **high analysis** weed and brush killers that **cover 50% more** area than ordinary sprays!

For the man who figures his cost on a per-acre basis instead of the "cost per can" . . . these Super-6 Concentrates pack in **six pounds of acid equivalent per gallon.** Each can gives you **1/2 more killing capacity** than ordinary 4-pound-per-gallon brands. Compare prices. You'll find Super-6 Concentrates **cost you less** money to use—two cans do the work of three!



CROP GUARD knocks down hard-to-control weeds with powerful root-deep killing action . . . guards corn, small grains, sorghum from tough weed competition.

BRUSH-O-CIDE for general control of mixed stands of brush. Use it to clear out brush-clogged fence rows, pastures, ditchbanks, and roadsides.

BRUSH BLITZ gives you 6 pounds of concentrated 2,4,5-T killing power. Use it to spray hardy brush and trees like oak, maple, ash and hawthorn.

FIELD CLEAN WEED KILLER — a powerful low-volatile weed killer—specially formulated for safer spraying of hard-to-kill weeds near sensitive crops.

This year, buy the brand
that packs the most kill per can!

MONSANTO CHEMICAL COMPANY
Organic Division
Agricultural Chemicals Dept.
St. Louis 66, Missouri

NEW CORN HYBRIDS Commercial production of some 15 brand-new NK corn hybrids will begin in 1960. Already tested in farm and picker-sheller trials, the new maturities range in area of adaptation from northern North Dakota to the southern edge of the Corn Belt!

NEW ALFALFA This is one of the many new experimental varieties developed by Northrup King and now under test for specific use in specific areas. (NK, long the leader in alfalfa developments, introduced Du Puits to the U.S.)

NEW NK37 BERMUDAGRASS Giant variety that grows from seed! Farmers from S. Carolina to California have forced it into very limited supply because it *best meets their needs* for hay and pasture.

NEW SORGHUM HYBRID X-3000 The *earliest* hybrid now available! Makes sorghum growing practical nearly up to the Canadian border! High-yielding, too – higher than open-pollinated varieties of similar maturity.

NEW RADISH Red Boy, developed by Northrup King. Outstanding for new short tops, scarlet color, flavor that meets growers' and housewives' demands.

Northrup King makes news in seeds

News in *seeds?*

Definitely. New varieties, new hybrids, new products of Northrup King seed research are making on-the-farm news from Coast to Coast. *Good* new seeds that are helping farmers get bigger yields, better crops from every acre of their land.

Some of the newest ones are shown here. Some others are *too* new to show. Reason: *No* Northrup King seed product is ever released until it's been fully and completely tested—in the laboratory, in the greenhouse *and* on the farm under the widest range of farm practices and growing conditions.

Good farmers the nation over count on Northrup King seed products—count on the integrity of the company that stands behind them. They count, too, on Northrup King seed research—carried on at locations from Florida to Oregon and from Arizona to Minnesota. Good reasons why *you* should look to Northrup King for better seeds—today *and* tomorrow.

Get more from every acre with...

NORTHRUP KING SEEDS

Minneapolis, Minn., Fresno, Calif., Boise, Idaho, and 36 branches

HE DOESN'T BUCK SNOWDRIFTS ANY MORE

Charles Buckenmeyer milks 150 cows and buys and sells heifers on his farm near Batavia, New York. It takes 20 to 30 telephone calls a day to run his operation. Usually six or eight are long distance.

Until about four years ago, Charley handled these calls on the house telephone. Since most of his calls came in the morning when people knew he would be on the farm, he spent a good part of his morning hurrying to and from the telephone. In winter when the snow was piled deep, it was no fun. And, Mrs. Buckenmeyer probably put in even more mileage since she had to find him in the buildings when he was wanted on the line.

With the barn 100 yards from the house, this was 3 or 4 miles of walking every day—in good weather or bad—year in and year out.

So, Charley had an extension telephone installed in his barn. That ended the running. And the best part is that the Buckenmeyer's extension costs about a penny for every mile of walking it saves.

If you want to make the most of your time, an extension or two around your farm can help you save a lot of it. Few investments return so much for so little outlay. Call your telephone business office. They'll be glad to help.

Mrs. Buckenmeyer thinks their barn extension is about the handiest thing on the place. "That running back and forth was just too hard. We're glad we've got the barn telephone." With two extensions in the house, Mrs. Buckenmeyer is never more than a few steps from a phone.

BELL TELEPHONE SYSTEM

"Our DARI-KOOL Saved $168⁰⁰ Worth of Milk During a Recent 24 Hour Electric Power Failure!"

MR. R. L. HASELBUSH, R 1, Longmont, Colorado, writes as follows—

"We recently had an electric power failure that lasted 24 hours. On our first milking, even after the tank was washed with hot water, the milk was cooled down to 38° in about one hour. At pick-up time the 320 gallons of milk was down to 42°, with no electric power during the 24 hour period. The power came on just before pick-up.

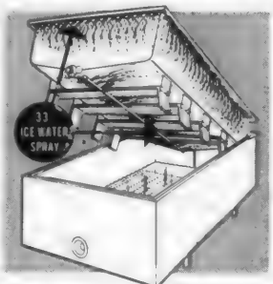
We are sure glad we had an ice-bank cooler instead of a direct-expansion. We feel sure our Dari-Kool saved us $168 worth of milk on this power failure."

(signed) R. L. Haselbush W. R. Haselbush

A Dari-Kool, with its large reserve ice-bank has saved many a dairy farmer the loss of a tank of milk. Direct-expansion coolers provide no cooling during electric power or compressor failures. This is one of the reasons why more and more dairymen are switching to Dari-Kool bulk milk coolers.

DARI-KOOL COOLS MILK FASTER —DOES NOT FREEZE MILK!

33° ice-water is pressure sprayed over all 4 sides and the entire bottom of the milk tank. Milk heat is removed faster than is possible with any other cooler or method. The milk cannot be damaged by freezing. Dari-Kool's faster cooling assures lowest blend temperatures — higher quality milk.



PREFERRED 3 TO 1 OVER ANY OTHER BRAND!

Shown above, new low-design 400 gallon Dari-Kool. Also available in capacities from 100 to 1250 gallons.

MEETS ALL 3A STANDARDS

DARI-KOOL
BULK MILK COOLER

WRITE DEPT. IS TODAY FOR YOUR NEW

FREE MILKHOUSE PLAN KIT

DAIRY EQUIPMENT CO., Madison, Wisconsin

Manufacturers of KARI-KOOL TRUCK TANKS

Distributed in Canada by BEATTY BROS., Fergus, Ontario

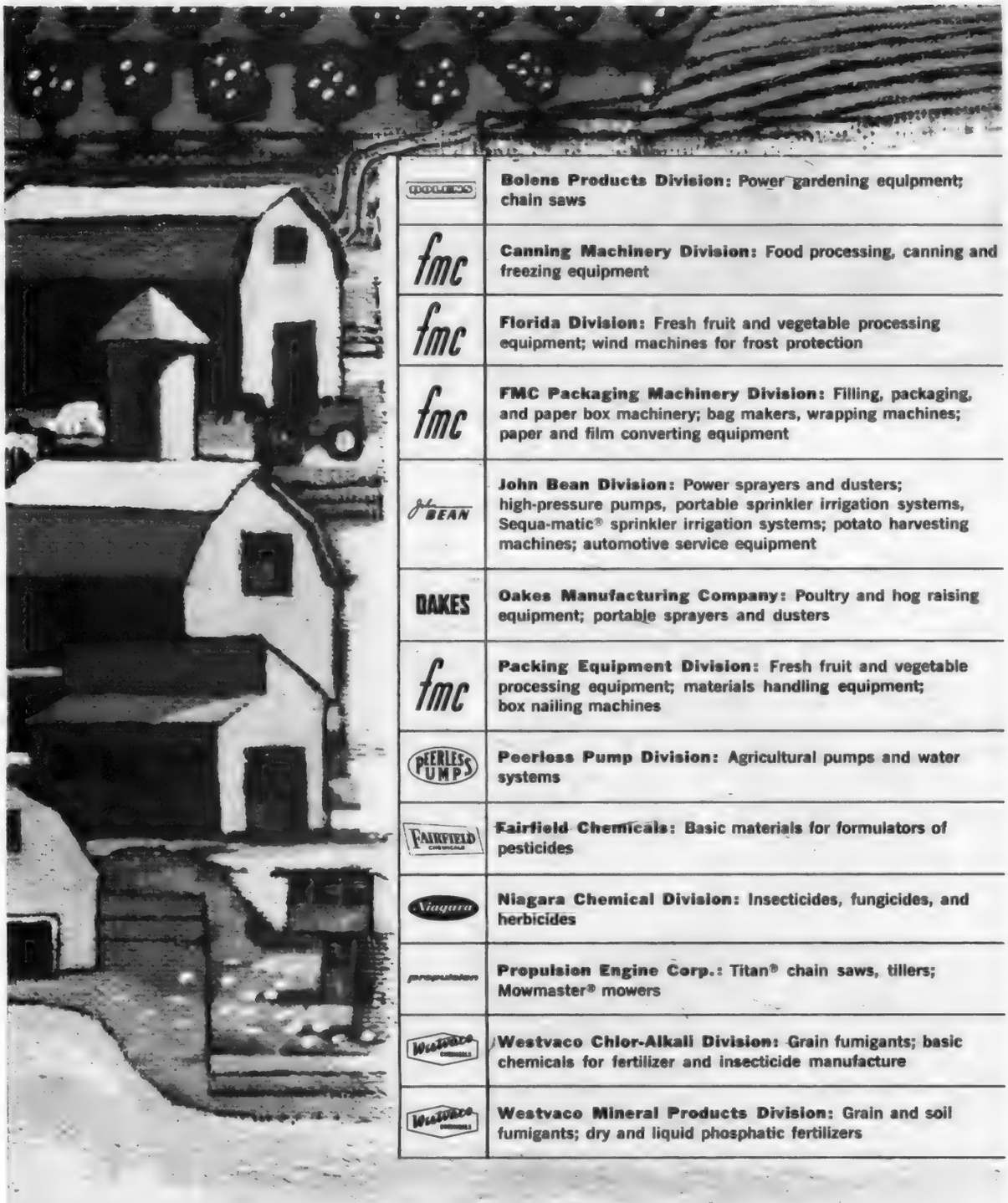
HOW FMC SERVES AGRICULTURE

For more than 75 years, FMC's rapid and continuing growth has been closely allied with service to agriculture. Listed on the opposite page are thirteen FMC operations whose work is devoted to making the growing, harvesting, and marketing of countless crops more efficient, more productive, more profitable.

FMC's service to agriculture is a good example of how our company's policies work to the customer's benefit. Each of our operations develops and manufactures specialized products for its particular market. And in doing so, each can draw upon (1) its own resources, (2) the skills and experience of its sister divisions, and (3) the facilities of our central engineering and chemical laboratories.

As in agriculture, FMC's dynamic policy of product diversification and operational decentralization has been applied to many other industries. This unique application of broad resources and creative talents has enabled FMC to become a leader in **Basic Chemicals, Industrial and Agricultural Machinery, and Military Defense Materiel.**

For complete listing of our products and services contact FMC, Dept. PRA, Box 760, San Jose, California



BOLENS	**Bolens Products Division:** Power gardening equipment; chain saws
fmc	**Canning Machinery Division:** Food processing, canning and freezing equipment
fmc	**Florida Division:** Fresh fruit and vegetable processing equipment; wind machines for frost protection
fmc	**FMC Packaging Machinery Division:** Filling, packaging, and paper box machinery; bag makers, wrapping machines; paper and film converting equipment
John BEAN	**John Bean Division:** Power sprayers and dusters; high-pressure pumps, portable sprinkler irrigation systems, Sequa-matic® sprinkler irrigation systems; potato harvesting machines; automotive service equipment
OAKES	**Oakes Manufacturing Company:** Poultry and hog raising equipment; portable sprayers and dusters
fmc	**Packing Equipment Division:** Fresh fruit and vegetable processing equipment; materials handling equipment; box nailing machines
PEERLESS PUMPS	**Peerless Pump Division:** Agricultural pumps and water systems
FAIRFIELD CHEMICALS	**Fairfield Chemicals:** Basic materials for formulators of pesticides
Niagara	**Niagara Chemical Division:** Insecticides, fungicides, and herbicides
propulsion	**Propulsion Engine Corp.:** Titan® chain saws, tillers; Mowmaster® mowers
Westvaco CHEMICALS	**Westvaco Chlor-Alkali Division:** Grain fumigants; basic chemicals for fertilizer and insecticide manufacture
Westvaco CHEMICALS	**Westvaco Mineral Products Division:** Grain and soil fumigants; dry and liquid phosphatic fertilizers

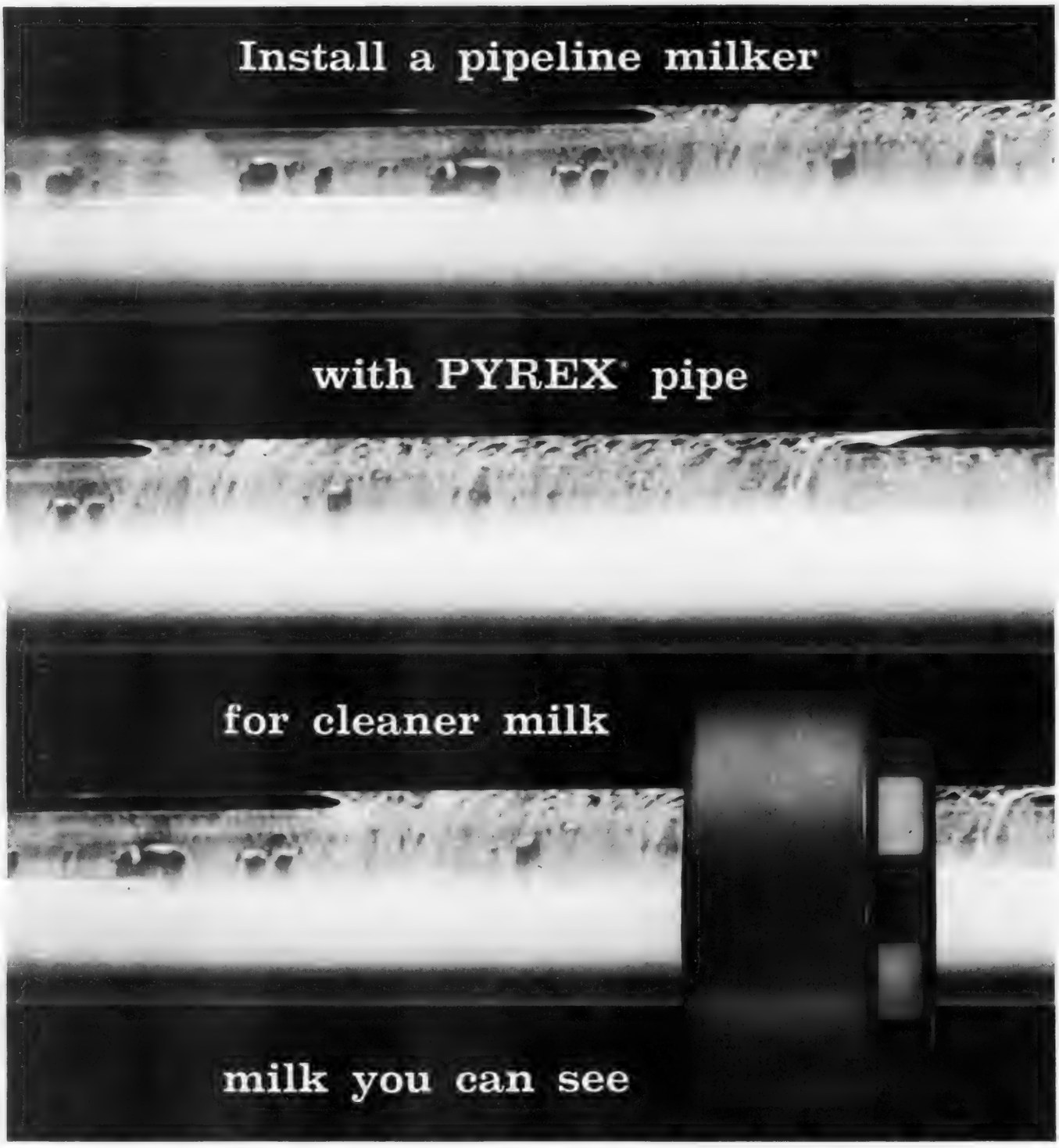
Putting Ideas to Work

fmc
FOOD MACHINERY AND CHEMICAL CORPORATION

FOOD MACHINERY AND CHEMICAL CORPORATION

Executive Offices: San Jose, California

ADMINISTRATIVE OFFICES: Machinery Divisions, and Defense Materiel, San Jose, California
Chemical Divisions, New York City • FMC International, San Jose, California; New York City



You make the most of a pipeline milker when you use PYREX brand pipe.

With glass you can see that the pipe is clean . . . spot trouble before it starts. After cleaning, you can check sanitation visually . . . dirt can't hide behind glass.

FASTER CLEANING, TOO. PYREX pipe won't corrode or pit, so you can use stronger, faster-working cleaning solutions. The pipe is smoother than any metal and speeds cleaning, discourages the build-up of milkstone or bacteria.

FREE BOOKLET. See the many ways you can run your dairy more profitably, with a PYREX pipeline system, by writing to us at 22 Crystal Street, Corning, N. Y., for the booklet "Facts about PYREX Pipe." Or call your dealer representing: Chore Boy Company • DeLaval Separator Company • Hinman Milking Machine Company • James Manufacturing Company • Perfection Manufacturing Corporation • Rite-Way Dairy Farm Equipment Corporation • Universal Milking Machine Division.

MILK PURITY-PROTECTED with PYREX® GLASS PIPE

CORNING GLASS WORKS

CORNING MEANS RESEARCH IN GLASS

This Gold Star Service Policy *Is Back of Your* CHORE-BOY MILKING SYSTEM

CHORE-BOY
Gold Star
SERVICE POLICY
and
GUARANTEE

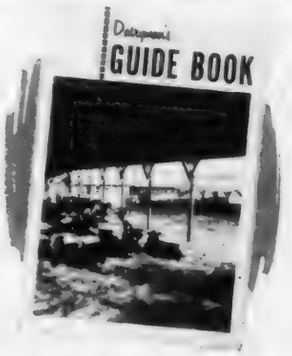
OWNER

NAME Mr. John Robinson
ADDRESS Pleasantville, Wis.
PHONE EX 4-2457

The dairy world has come to expect from Chore-Boy new and better things in the way of handling and milking cows. This is indicated by the fact that Chore-Boy is now the leading manufacturer of pipeline milking systems in the U. S. A. and Canada. Now, Chore-Boy is providing purchasers of its Pipeline Milking Systems with a Gold Star Service Policy and Guarantee, which is the strongest policy ever offered users of such equipment. The 7-point Guarantee covers installation, performance, periodic inspection and replacement of parts due to defective materials or workmanship. It is backed by a specially-trained and authorized dealer organization. Each Service Policy is numbered with a record of it filed at Chore-Boy headquarters office, and a copy kept by the dealer. With the finest pipeline milking system on the market, backed by this Gold Star Service Policy, you are assured that your cows will be milked in the best and fastest way for producing highest quality milk.

What's Wrong With Dairying?

In 1957 Purdue University found that dairymen in Indiana were receiving a labor income of 77 cents an hour. In 1958 the U. S. Dept. of Agriculture found that dairymen's labor income in three representative commercial dairy areas varied from 36 to 79 cents per hour. In short, what's wrong with dairying is that the men who produce our milk are not getting enough pay for the very important service they render. As a result, many dairymen are going out of business. Those who are staying in this occupation for which they are best fitted by experience and liking, are adding more cows to increase their incomes. But nothing is gained by adding more cows unless the hours of labor per cow are reduced so that milk production per man can be increased.



This Book Points The Way To Profitable Dairying

This 40-page book gives facts, figures and plans on how the use of loose housing and the Herringbone Milking System will reduce hours of labor per cow from 120 to 160 (now generally required) to around 40 hours per cow. It shows that income can be increased 3 to 4 times over methods now used by most dairymen.

It also shows how the dairyman who wants to stay with stanchion housing can handle more cows with less effort.

This useful book which many dairymen and authorities say provides the most helpful information available on solving present dairy problems, is free to any dairyman — just ask your Chore-Boy Dealer for a copy, or mail coupon below.

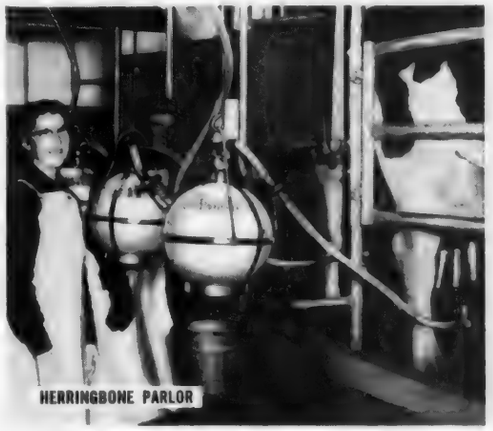
Published by
FARM ECONOMICS RESEARCH INSTITUTE
of the CHORE-BOY Manufacturing Co., Inc.

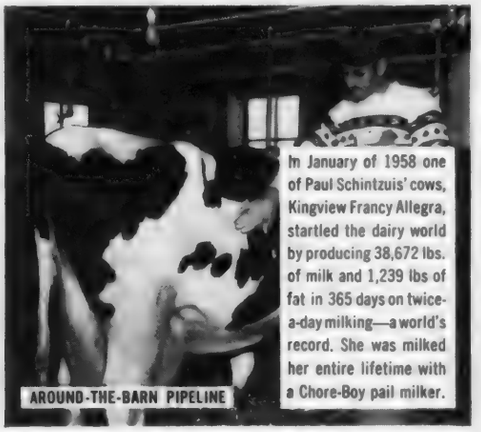
Since the problems of dairymen, as well as all farmers, are largely of economics or money, Chore-Boy created The Farm Economic Institute to gather, study, disseminate facts, figures and plans that will be helpful to dairymen and hog producers.

Get Your FREE Copy!

Your Chore-Boy dealer will be pleased to give you a free copy of the Dairyman's Guide Book. If you do not know your Chore-Boy dealer, mail coupon below.

Results Like These Prove the Superiority of CHORE-BOY Milking


HERRINGBONE PARLOR


AROUND-THE-BARN PIPELINE

In January of 1958 one of Paul Schintzuis' cows, Kingview Francy Allegra, startled the dairy world by producing 38,672 lbs. of milk and 1,239 lbs of fat in 365 days on twice-a-day milking—a world's record. She was milked her entire lifetime with a Chore-Boy pail milker.

Saves 3 Hours a Day... Milking Now a Pleasure

Above — Mr. and Mrs. John A. Lahmeyer of Bland, Mo., use a Double-4 Chore-Boy Herringbone Pipeline System, about which he states: —"My wife and I were spending about 5 hours a day to milk our herd of 38 Holsteins. That didn't give us enough time to keep our 200 producing acres operating. Now, with the Chore-Boy Herringbone, we milk in 1 hour in the morning and 1 hour in the evening. Our milking is no longer a chore, but a pleasure. Our first bacteria count was less than 2,000. My St. Louis Health Dept. Grade A Inspection sheet did not have a check on it!"

Average 17,450 lbs. of Milk... and No Mastitis

Above — Paul Schintzius of South Wales, New York, has used Chore-Boy pail milker for 12 years — making many records including the world's record above. Last year he installed a Chore-Boy Around-the-Barn Pipeline Milking System, about which he says: — "I'm very well pleased with my Chore-Boy pipeline system. I'm now milking 10 more cows than I ever did before, in less time and a lot easier. It does a dandy job of milking, as shown by the fact that last year my herd of 42 head averaged 615 lbs. fat and 17,450 lbs. milk. It is so simple to operate and easy to keep clean. Bacteria counts are very low."

CHORE-BOY "KNOW-HOW" MAN

He is trained to help you put your dairy operation on a real money making basis. With his advice you will have an efficient plant producing top quality milk at lowest cost.

CHORE-BOY LOW-VACUUM MILKING SYSTEMS

CHORE-BOY PURCHASE PLAN

Use your Chore-Boy equipment while it pays for itself — with 36 months to pay — or 5 years with purchases of $2,000 or more. You are covered by fire and comprehensive insurance.

For Complete Information, write Dept. 39, CHORE-BOY MANUFACTURING CO., Inc., Cambridge City, Indiana

CHORE-BOY MANUFACTURING CO., INC.
Dept. 39, Cambridge City, Indiana

Please send, without obligation, the new DAIRYMAN'S GUIDE BOOK.

I am milking.....cows. I am using a Pail Milker.....Pipeline Milker.....

NAME.....

TOWN.....RFD.....

COUNTY.....STATE.....

INTRODUCING...THE ALL NEW Champ BY STUDEBAKER

by Harold E. Churchill, President of Studebaker-Packard

Smartest pickup in the country—beautifully built and beautifully styled

Here in South Bend we have just brought out a remarkable new pickup truck, the CHAMP.

When we designed the Champ, we kept uppermost in mind the needs of people who live and work in the country. A handy, go-anywhere truck which will work its head off for you—but a smart, handsome vehicle you'll be proud to drive. Designed with lots of room and comfort. Responsive and easy to handle.

We believe you want a pickup which is honestly put together, of good stout metal, with a sturdy frame that won't rack and twist when you're hauling a load over uneven land or crossing a creek bed.

You want a truck with good ground clearance, because you won't spend all your time on paved roads. You want good *visibility* all around—but especially in front. When you're driving up a timber road or following a pair of wheel-ruts in mud or snow, the high seat of the Champ and the short, low hood let you see 10 to 14 feet closer ahead than if we had put a high, square hood on it.

A NEW KIND OF TRUCK

You can see from the picture on the next page the smart modern styling of the new Champ. You can see how handsome it would look out in front of your place.

But underneath that fresh, trim design you have a *fully specified* truck, from power plant to payload—you won't find anything more rugged! Frame, axles, brakes, transmission and all components are built for heavy duty. Whichever engine you choose, it will last far longer (and give you far better gasoline mileage) because every one incorporates such top-quality features as silichrome exhaust valves, polished valve stems, pressure-lubricated tappets, automatic spark control, and a combustion chamber so designed that you get high-compression power without having to buy premium grade gasoline.

SUITS THE WIDEST RANGE OF USES

You can get the Champ in ½ Ton size (5000 and 5200 lbs. G.V.W.) or ¾ Ton size (7000 lbs. G.V.W.) Any body style you want—Pickup Box, Platform, or Stake Body. Wheelbases are 112″ and 122″.

You have 4 engines to choose from, all with high torque output at relatively low rpm, for good lugging power and long life; 90 HP Six; 118 HP Six; 180 HP V-8; 210 HP V-8 (and a special power pack for this one, with 4-barrel carburetor and dual exhausts, which give you 225 HP).

In transmissions, you also have a wide range of choice: with clutch and stick shift you get 3-speed, 3-speed with economy Overdrive, or 4-speed. Or you can have a reliable, heavy duty Automatic transmission. (With any of these, there are several choices of rear-axle ratios.)

GOOD LOOKS WITH A PRACTICAL PURPOSE

You'll be proud of the fresh, appealing style of your Champ, especially the smart cab. Seats and sides are fully upholstered in colored heavy-gauge vinyl—soft as leather, but many times longer-wearing. The dash has a compartment with a lock—at no extra cost. There is all the room 3 people want. (The deluxe cab also has such features as a safety-padded dash, padded armrests, and a two-piece rear window which slides open for breezy ventilation in hot weather.)

But underneath the stout, sturdy sheet metal and the high-gloss enamel finish (which keeps its gloss without waxing), there are a host of practical, functional features you will appreciate, I am sure.

That short, compact hood lets you lean into the engine compartment to check your oil or the points, without having to climb like an acrobat over high, exaggerated fenders. A man just 5′8″ tall can stand at the front bumper and remove the rearmost spark plug. Windshield wiper

motor and all your electrical wiring are right under the hood—you don't have to climb under the instrument panel inside to check a connection or replace a fuse.

And you'll like other ways in which we've combined beauty with duty. That handsome radiator grille is stamped of sheet steel—if it gets hit, you can unscrew 4 bolts, remove it, and straighten it out. No heavy, brittle, expensive chrome-plated castings to pay for!

There are many things about the Champ which appeal to women as well as to men—the wonderful ease of driving, the luxurious comfort, and the way it handles.

WHAT ABOUT COST?

Despite all these extra-quality, extra-mileage, extra-service features in our new Champ pickup – the price is lower than in any other pickup on the market – including those which are not as ruggedly built or as fully specified.

Then consider the honest reputation of Studebaker trucks, over two generations, for the more important savings that begin *after* you put them into service. They have the finest record of any trucks for low maintenance costs—for economical gasoline mileage—for being on the job week after week without downtime.

From every standpoint, the new Champ pickups now at your Studebaker Lark dealer's will earn your respect and approval. Let me urge you to visit your dealer this week and take the wheel for a trial run—you'll fall in love with the Champ, just as we have, here in South Bend.

H. E. Churchill

SPECIAL FEATURES OF THE CHAMP

HILL HOLDER, an option *available only from Studebaker:* Lets you stand on a hill with your foot *off* the brakes. Keeps your brakes engaged until you release the clutch.

TWIN TRACTION differential keeps you going through mud, sand, snow, without having to mount tire chains.

TWO-PIECE REAR WINDOW, full width of the cab, slides open for full ventilation. This is an option on the standard Champ, but a regular feature of the deluxe cab.

2-STAGE REAR SPRINGS, give the same comfortable ride whether truck is light or loaded. Main spring leaves give you an easy ride without a load. Second stage spring leaves carry the weight and protect the chassis when you have a load.

CUSTOM DESIGNED FRAME for each Champ has full box-section cross members, alligator-jaw mounting, and K-member at front end, to provide extra strength without unnecessary weight.

PICKUP BOX on the Champ has a full 51½" of clear floor width, with no fender wells. Double-walled steel sides and ribbed all-steel floor give greatest strength and longest life. Notice the low loading height. New safety tail light swings away under pressure, then back by itself, to avoid breakage.

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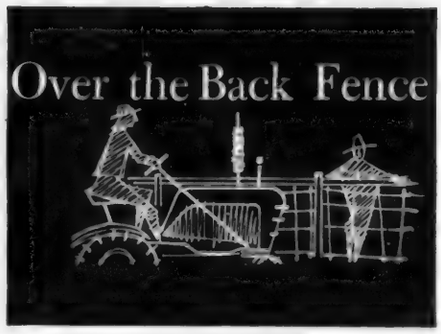

Chemistry and Politics If the unfortunate episode called the "Cranberry Crisis" showed anything, it showed agriculture as a minority group, a shadow of the former farm bloc that made politicians cower and administrations tumble.

At the turn of this century, when half America was farm families, it paid a budding statesman to know his hogs, and crops. Those days are gone. Today, when over ninety per cent of the population are non-farm born, Average Joe, who buys his food in the supermarket, doesn't know or care much for the farmer.

There isn't much doubt about the thoughts of Average Joe after the Cranberry Crisis. Secretary Flemming is "a man who is protecting my interests. Nobody else cares about me. Big business and big farmers would sell me poisoned food if it wasn't for the Secretary of Health."

Fifty years ago, Average Joe would have known enough about farming to sympathize with the growers of cranberries who suffered because a few wrongly used a poison. Today Average Joe doesn't know and doesn't care. Today, we, the farm minority, must remember we depend on Average Joe. He is just beginning to realize this. If the non-farm population is given a bad opinion of us, it could ruin many farmers.

Suppose the Secretary of Health had picked on the penicillin residues in milk instead of the aminotriazole in cranberries? A 1959 F.D.A. survey showed 3.7 per cent of U.S. milk had an undesirable penicillin content. Some city-by-city figures were: Boston, 6 samples out of 60 contained penicillin; St. Louis, 2 out of 72; Denver, 1 out of 70; New Orleans, none out of 60; Los Angeles, 3 out of 69. The F.D.A. were told by medical specialists that even a small amount of penicillin could cause a reaction in 10 per cent of Americans. But if a politician chose to publicize some medical danger in penicillin-tainted milk, it could make the public avoid milk like the bubonic plague or the 1959 cranberry crop. All this could happen because one farmer in every two dozen is careless about shipping milk too soon after treating with penicillin.

It doesn't stop at milk. If a congressional investigating committee tabulated the occasions on which the careless farmers break the law in applying poisonous weed and bug killers, it would make the confession of the TV quiz shows look like a second-rate county fair.

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Here is the World's easiest to assemble-on-the-farm grain bin! All sections are accurately stamped to size and all holes punched in a single die stamping operation. All sections fit, all holes line up. You'll be amazed at how easy the assembly job is.

LONG storage and drying bins are loaded with features that bring the extra profits of drying and storage right to your farm. Precision formed sections make assembly easiest of all. X-braced door, triple hinges, heavy galvanized side sheets and double bolts of all vertical seams—all add up to extra built-in strength and durability. Available in four diameters with capacities from 1,000 to 15,000 bushels.

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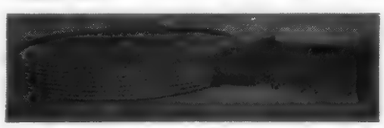
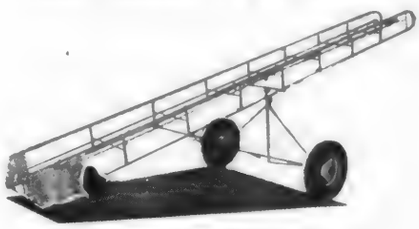


Perforated steel drying floor. Strong, sturdy, economical. For any make bin.



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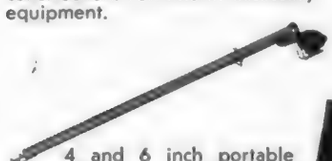

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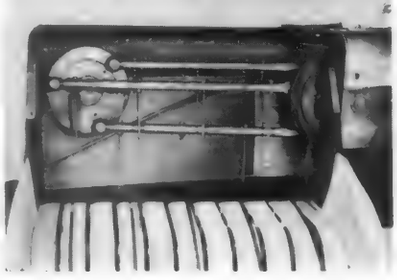

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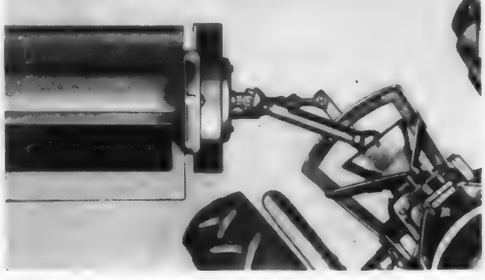

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NEW ROTO-FLO FEEDER means capacity in every crop. Positive fork-like action lifts the crop gently, loosens the bunches and fills the top of every beat.

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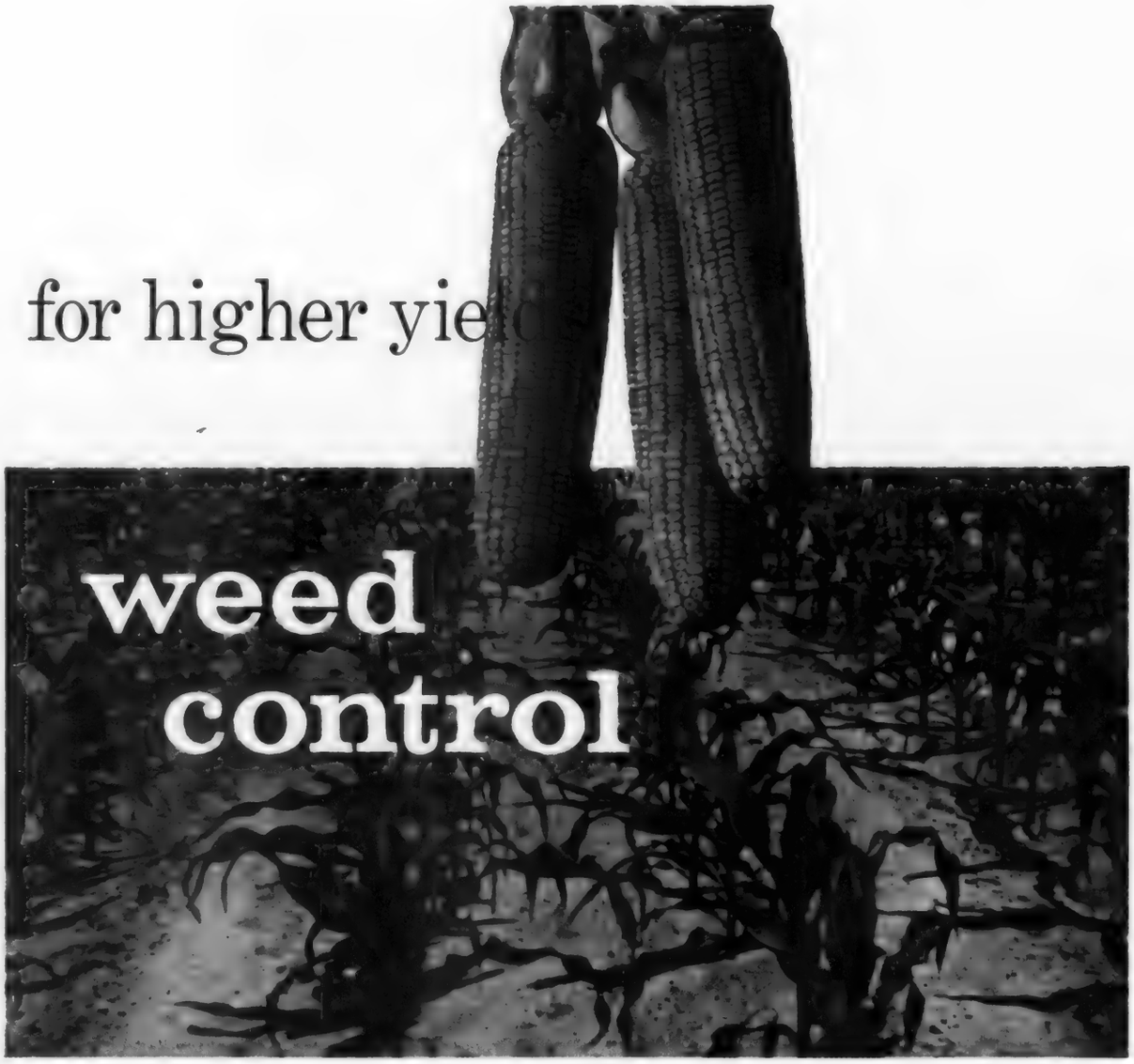

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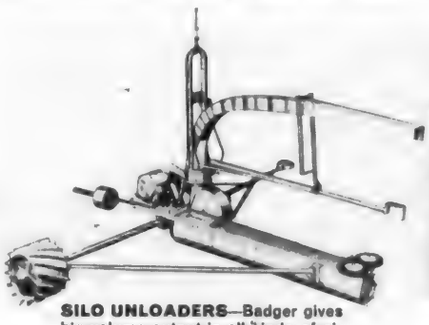

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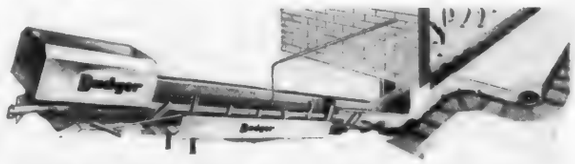

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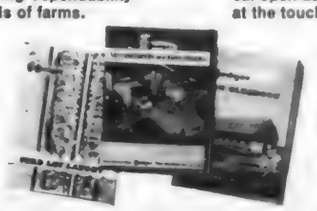

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This is the new, all-job Massey-Ferguson 65 Diesel. And it's the best reason you ever had to join the big swing to the modern kind of power . . . *diesel* power!

First, you get the operating economies that only the Ferguson System provides. There's no excessive, built-in tractor weight to waste fuel on the light jobs. Yet you automatically get all the traction you need for the heavy jobs, through the famous Ferguson System of weight transfer.

Second, you get unequalled savings in fuel costs with a new Massey-Ferguson diesel engine that delivers up to 50% more horsepower hours per fuel-dollar on *all* jobs, light or heavy.

Third, the MF Diesel pays off your investment in a diesel tractor fast! It is so versatile . . . does all kinds of jobs around the farm so efficiently and economically . . . that you'll work the MF 65 Diesel more hours the year 'round than any tractor you've ever had. It's those *extra* hours of work you get done that convert your savings on diesel fuel into extra operating profits in a hurry!

And . . . you get a revolutionary new time-saver in the new MF 65 Diesel that you get in no other U.S. tractor. It's the new Massey-Ferguson Differential Lock that gets you through slickest going because each wheel pulls its share of the load. The Differential Lock and arm-saving Power Steering are standard equipment on all four front-end models of the new Massey-Ferguson 65 Diesel.

This is the diesel for the look-ahead man with today's modern, bigger farm . . . the diesel for the *Massey-Ferguson kind of a man!*

New Differential Lock gets you through! When a wheel spins in unusual slick going, just depress the Differential Lock pedal. Instantly the differential locks both ends of the axle together, giving the power to the wheel that *has* traction, so you pull right through!

Brute diesel lugging power! Working this 13-tine MF 139 Tiller 12 inches deep in hard, compacted soil, the MF 65 Diesel lugs down and pulls right through. Fully mounted, Ferguson System controlled implements give it unmatched maneuverability and ease of transport.

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By Charles Straub

Jess McGinley
stocks his grass and keeps it too

"A CONSERVATION PLAN is a state of mind," says Jess McGinley. "It's like a big idea you have in your head all the time and every time you fly over your range, or ride out on horseback, or put out salt, or do any other job you always have that idea in front of you and you're looking around to see how you're fulfilling it."

McGinley is a Nebraska rancher of top caliber. He is also recognized by his neighbors as well as by the technicians of the Soil Conservation Service as outstanding in his devotion to the kind of practices that not only make ranching a profitable and rewarding way of life but which will guarantee that he can pass on to his son and daughters a much better piece of land than that with which he started.

Jess McGinley is a slender, wiry, extremely friendly individual in his mid-forties. He is known far beyond his immediate area as a real good cattleman. He makes no attempt to impress anyone. The stranger would never suspect after a casual meeting the degree of Jess' success. It doesn't come out in his conversation. But even a few hours around the ranch are enough to open anyone's eyes to the fact that this is an outstanding operation. Practical, solid, substantial, modern are the words that immediately come to mind to describe it. And the foundation upon which it is all built is good range management.

No one can laugh off Jess' conservation work with the frequently heard remark, "Well, that might be all right on a small scale, but it would never work on a big, commercial operation." A large cow herd wears the McGinley AX brand and the ranch spreads over 33,000 acres. It is one of the biggest in Cherry County, Nebraska, a county which, incidentally, is one of the largest in the nation, about as big as the land area of the states of Connecticut and Rhode Island combined.

The ranch headquarters provides a variation in an otherwise unbroken landscape of grass-covered hills and shallow lakes as Jean, the McGinleys' eldest daughter, rides out to check the condition of a nearby pasture. Most of the trees in the picture—Chinese elms, box elders or cottonwood—are the result of McGinley's tree-planting project.

Yearling steers and heifers are the end product of the McGinley ranch. This, of course, requires more elbow room than a cow-calf set-up, necessitating, as it does, carrying the offspring for another season after they have been weaned. The ranch is integrated with a big feedlot at Ogalalla, run by Jess and two of his brothers, and a fourth partner, Leo Schilz, and most of the McGinley yearlings go to this feedlot.

Jess is an enthusiastic horseman. He is a confirmed believer that it takes good horses to handle cattle. But for the rest of his ranch work he is completely mechanized. Tractors of every type, Jeeps, trucks, 14-foot mowers and sweep-rakes mounted on specially adapted tractors are to be seen everywhere. There is even some big industrial-type road building equipment on hand. "We've been building our own roads so we could get semi-trailers in here to haul the cattle rather than trail them," Jess says. "In some spots, if you get down below the sand a little piece you get into this heavy hardpan. We've uncovered a couple of pits of that stuff and that's what we're using to build our roads."

Making and feeding hay are two of the most essential jobs on any Sandhills ranch. Jess puts up 3000 to 4000 acres every year, stacking the hay right out in the middle of the big meadows then pushing the stacks over to the corner of the field with big four-wheel drive tractors. During the winter feeding season, these stacks, weighing around five tons each, are pushed onto low-boy carriers and the hay is forked out to the herds as the big tractor slowly picks its way across the field without benefit of driver.

Being in the Sandhills, McGinley has problems as well as advantages unique to his situation. Water, for example, is no problem; but the sand is. Graze the cover off it and it begins to move. The grass, as he points out, "is not real hard and doesn't make as strong feed as in the hard grass country. But we have an abundance of it." The principles on which he operates though, can be applied on any range.

Jess has never formalized those principles himself, but the Soil Conservation people who have refer to them as the four P's of good range management: Proper numbers of livestock; proper season of use; proper distribution of livestock; and; proper kinds of grazing animals. To these Jess has added a fifth which might be called the proper use of trees. This one we'll get to a little later.

Stocking and Distribution

Stocking the range with the proper kinds of livestock is no problem in the Sandhills. Before the coming of the white man, the area was the natural grazing ground for the buffalo. Cattle moved in to displace the buffalo, and cattleland it has been ever since. No class of livestock can put it to such good use as the cow and her offspring.

Proper numbers for a ranch can result from trial and error. But a scientific inventory of soil, water, and plant resources is now common for long term plans. The kinds of native plants reflect poor, fair, good, or excellent range condition, considering potential cover for each type of range site. Range management makes the difference. Within the long term plan, numbers are adjusted almost annually to meet changes in growing conditions.

These are under the direct influence of the weather, particularly precipitation.

The Sandhills, because of their abundant

Jess McGinley
stocks his grass and keeps it too

Conservation pays off even on the biggest farms and ranches. Jess McGinley's experience on his 33,000-acre spread in Nebraska's Sandhills is striking evidence of this. He follows a conservation plan worked out by the technicians of the local Soil Conservation Service. He has carefully adjusted his cattle numbers to his range potential, has deferred grazing during critical periods, and has scattered his herds over his range by the development of numerous watering places. He has reseeded the native grasses where necessary and introduced new species and for the last 18 years he has planted 5,000 trees a year in an area where trees were formerly unknown.

The four-wheel drive tractor is left to its own devices and creeps slowly across the meadow as the driver and his assistant fork the hay off the low-boy for a bunch of young cows.

water supply and their sub-irrigated meadows, are subject to less fluctuation in stocking rates than most other grazing areas. McGinley uses a figure of one cow or steer to 15 or 20 acres in long term plans for his own well kept range.

Proper season of use and proper distribution of livestock are the departments where the artists are separated from the apprentices. This is where all the fine points of month to month management come into play. The theory here, as Donell Sylvester, the Work Unit Conservationist of McGinley's Soil Conservation district explains it, is that there are certain tall, highly productive and nutritious grasses from which the cattle graze a higher percentage of green foliage than from all the others. These the conservationist calls the decreasers. In McGinley's area these are such grasses as sand lovegrass, big bluestem, sand bluestem switchgrass and prairie sandreed. Also present are other shorter grasses, normally of secondary importance, ready to take over as the decreasers diminish. This second group is know as the increasers and include purple lovegrass, sand dropseed and blue and hairy grama. Since a vacuum is as abhorrent on the range as in a laboratory, if this group is pushed too hard, cacti, yucca, green sage, sandhill muhly, brush and other weeds referred to as the invaders, move in. The conservationists rate the condition of a range on the percentage of each of these groups found growing there as shown in the chart on page 64.

These kinds of plants vary, of course, from one area to another, depending upon soil and climate. In the Texas panhandle, for example, some decreasers would be sideoats grama and vine-mesquite. The increasers would include buffalo grass, Texas grama, and perennial threearm; and mesquite, red grama, and tumblegrass would be among the invaders. Soil Conservation Service technicians assigned to local Soil Conservation Districts can furnish lists and descriptions of the plants in these various categories for any section.

Take Half, Leave Half

The rancher's job, regardless of what he may call or cuss these various groups of plants, is simply to see that his pastures contain a maximum of the decreasers and increasers and an absolute minimum of the invaders. The conservationists have a slogan to promote this condition: "Take half and leave half" of each year's growth.

McGinley strongly endorses it. "Cut back for a while," he says, "and you'll be surprised how much more stock a piece of range can carry." He starts his herds on summer range about May 10 and runs them on these pastures until late October. But during these months he rotates his grazing among pastures and some ranges are left untouched for the entire season. This is the McGinley variation of the "take half, leave half" theme. "I rest each pasture during the growing season every three years," he says. "The time it does the most good to rest a pasture is during the growing season; so I keep the cattle off all summer then turn them in in the fall when they can harvest the summer's growth without doing any damage.

"When to move cattle from one pasture to another during the summer is one of those things you can only determine from experience. You've got to watch the condition of the cattle as well as the grass. If those better grasses are getting hard to find, and particularly if the cattle seem to be falling off a little, it's time to move to another range."

A Catalog of Some G

Big Bluestem: A tall bunchgrass, extremely leafy. Like all the grasses in this brief catalogue, this is a warm-season perennial. If never grazed shorter than six to eight inches during the growing season enough green leaves are left to promote fast regrowth. Adapted to most sandy loam soils in the southeastern Great Plains. Highly palatable as grazing or hay; high feeding value. This is the king of the prairie grasses. Good soil- and moisture-conserving plant. The roots saturate the top two feet of soil and the dead leaves form a good protective litter on the surface.

Sideoats Grama: A mid grass. Adapted to most soils but does particularly well on well-drained uplands. Grazed readily by livestock. High feeding value. Good soil- and moisture-conserving grass. Will increase and replace taller grasses abused by overgrazing; but will gradually decrease if grazed closer than two to three inches. Good seed producer.

Sand Lovegrass: A tall, leafy grass with bunchgrass growth. Adapted to sandy soils in the 18 to 35-inch rainfall belt. High feeding value; one of the "ice cream" grasses in palatability. Good soil-conserving plant as it produces a dense, deep root system. Good seed producer.

Switchgrass: A sod-forming tall grass. Adapted to a wide range of soil and climatic conditions. Winter hardy and drought resistant. Eaten readily by livestock when grazed or as hay. Good feeding value. Good soil- and moisture-conserving plant. Should not be grazed closer than five to seven inches during the growing season. Usually seeded in mixtures with bluestem, Indiangrass, and sideoats grama.

Blue Grama: A short grass; grows erect in defi-

When grass is rested this way it is given a chance to store up the food it needs to recover and grow for the next season. E. J. Dyksterhuis, regional range conservationist, Soil Conservation Service, Lincoln, Nebraska, goes along with this and stresses the fact that "grass blades are factories."

"If we keep down the shoot we kill the root," he says. "Green leaves manufacture all the food from which roots grow. Suppose we graze off the shoot that comes from root storage in the spring. This is the shoot which was to have been the food manufacturing apparatus for the year. If the first shoot is grazed there is usually enough storage to put out another shoot; but if we do this repeatedly in the same season we starve the root; we shorten it, reduce its ability to reach moisture and nutrients. It takes a big factory above ground to turn out much goods. The man whose pasture looks only half used each fall gets more grazing and more beef than the man whose pasture is kept short."

In accordance with these ideas the Soil Conservation Service makes the following recommendation for resting and grazing pastures in the Sandhills region (similar recommendations are available for other areas):

For the most range improvement—rest from mid-March to the end of October.

To improve warm season plants—rest from mid-April to the end of August.

To improve cool season plants—rest from mid-March to the end of June and again from the first of September to the end of November.

For the most forage—graze from mid-July to the end of September.

For the fastest gains—graze from the first of May to mid-July.

Blowouts

Next to a prairie fire the most feared thing on a Sandhills range is a blowout. This occurs when the grass cover is destroyed by overgrazing and trampling. The sandy soil is left with no protection whatsoever and when the wind hits it, huge, barren craters are produced which frequently spread over considerable acreage before they are brought under control. Concentration of livestock, particularly around water holes and on well-worn trails, are the chief causes of these cankers.

Fortunately, in the Sandhills country it is possible to sink a well almost anywhere and strike water. This enables the rancher to provide sufficient windmills and tanks so there is no reason for large herds to converge on any one watering place. On McGinley's range no animal need go more than a mile to water and in most instances the distance is considerably less than this. He has also tried to avoid putting his well in spots where the cattle would have to trail down steep slopes coming to water.

To further help to distribute stock on the range, Soil Conservation suggests placing the salt and also the back rubbers in spots which are far removed from water, and otherwise little used. McGinley feels that in his case with an abundance of windmills and tanks distribution of grazing is good and this practice is unnecessary. He is quick to agree, though, that it is a precaution he would otherwise follow.

As an example of his generous use of wells, it is a common thing on the McGinley ranch to see a windmill within a hundred yards of a big lake. "I want to be sure those cattle get good water at all times," Jess says. "Sometimes that water gets pretty alkaline and they won't take on as much as they will when they can get good, sweet stuff. When that happens they don't gain like they should.

"We can generally hit water here at about 35 feet, but we always go down to

THE RANGE GRASSES

nite bunches. Adapted to sandy and hard lands and will stand extreme drought. Grazed by all classes of livestock but somewhat low in forage productivity. High feed value. Cures on the stalk and makes good winter grazing. Good soil-conserving plant. Fair seed producer. Should not be grazed closer than two or three inches during the growing season.

BUFFALOGRASS: A sod-forming short grass, seldom more than five inches tall. Its habit of growing its leaves close to the ground helps to protect it from overgrazing. Naturally adapted to the lower rainfall portion of the Great Plains. Good forage plant. Good soil cover. An increaser in tall grass ranges which have been overgrazed.

VINE MESQUITE: A mid grass. Produces long, tough runners forming a dense mat. Adapted to sandy loam to clay loam soils. Grows well in low places, along stream banks, ditches and other sites where moisture is favorable. Good forage plant relished by all classes of livestock. Good grass for waterways or for stream bank protection. Can be established from seed or sod.

SAND DROPSEED: A mid grass. Grows in small bunches. Adapted to sandy open soils. Good forage grass during early growth; unpalatable when mature. Seed very small, running about 5,000,000 per pound. Is considered an invader in the prairie bluestem belt, an increaser in other areas where it thickens its stand as the better grasses are overgrazed.

HAIRY GRAMA: A short grass. Adapted to sandy, rocky soils which are often too shallow for better grasses. A good forage grass readily eaten by all classes of livestock. An increaser on tall-grass ranges.

85 or 90 feet with our wells. The surface water has minerals that cause corrosion in the sand screen and the plunger."

Fences, of course, are another very definite means of controlling the distribution of stock. Jess' advice here is simply to "use horse sense." He has divided up his range so he can practice deferred and rotational grazing; has separated his wet meadows and haylands from his sandy upland range; and he lays out his fences so the cattle can graze in all directions from their watering places.

Yet, with all these precautions, blowouts are bound to arise. When they do McGinley knows how to handle them. Dumping hay on them is one step. The cattle feed there leaving their droppings, seed is separated out from the hay to start a new growth of grass, and the coarse material left behind affords protection against further blowing. After the new grass starts to come along the area is fenced off to give it every chance to recover.

Another treatment in the McGinley bag of tricks is to cut off the overhanging lips of the blowout with a bulldozer blade so the wind is unable to find a place to get a hold and tear away more soil. He still has some misgivings about this, though. "When you do that," he says, "you make the blowout bigger than it was before and I'm not sure whether it wouldn't do just as well to let that grass alone around the lip."

McGinley does not leave the matter of reseeding entirely up to nature. "Every spring we try to get some more wheat grass started along with some redtop and alsike clover on the bottom meadows," he says. "That wheat grass makes wonderful early spring grazing. We drill some of the seed with a pasture renovator at the rate of about 8 pounds per acre and give the legumes about 50 pounds of triple superphosphate. But I've found that the cheapest and one of the best ways to seed grass out here is with one of those little hand seeders. Just get a little patch started and the wind will soon blow seed all over the flat for you."

Trees

Tree planting is Jess McGinley's own special addition to the conservationists' four points. Except in the stream bottoms, trees are practically an unknown item on those vast Sandhills ranges. One can look for miles in any direction from almost any hilltop in that country without seeing a land mark of any kind, trees included. But Jess McGinley was raised and did his early ranching down along the Platte where trees were more plentiful. "They used to make wonderful shelter for the cattle when those cold northers would blow in," he says, "and I long ago decided I was going to grow trees up here no matter how hard it might be to get them started."

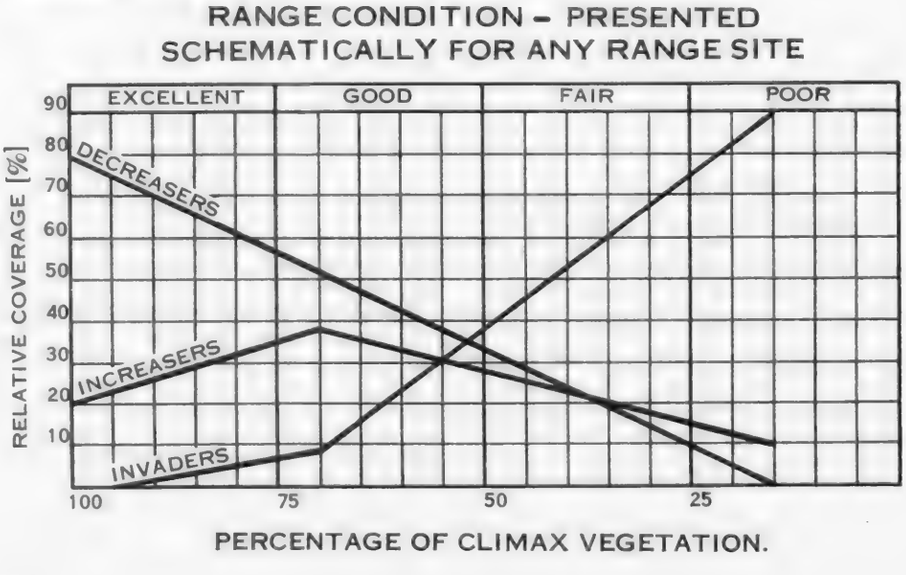
Jess planted his first trees 18 years ago, just a few years after moving up from the Platte valley, on a piece of bottom ground not far from the ranch headquarters. Since that time he has been putting out 5000 to 6000 trees a year. "You'd almost think Jess wants to be known as the Johnny Appleseed of Nebraska," a neighbor remarked recently.

Those first trees were Chinese elms. Today they stand 15 to 18 feet high and provide an excellent windbreak for the cattle which are fed on the adjacent meadows. Besides the elms, McGinley has also been planting box elder, cottonwood and golden willow on the bottoms, Ponderosa pine and red cedar on the hill tops. He has had better survival experience with the pines than with the cedars. "It takes a seedling about four years to get started out here," he points out, "in the meantime they just sit around in a kind of dormant state."

He gets his seedlings from one of the government sponsored Clark-McNary Nurseries at a cost of $3 to $6 per hundred. He estimates it costs him about $600 to plant 5000 trees, not including the cost of the essential job of building the fence to protect them from livestock.

The young conifers on the hilltops get little competition from weeds; but those on the lowland must be cultivated for the first few years. Not only that, but the land where they are to be planted is usually fallowed the previous summer. The Federal Government will pay the cost of cultivating for three years. Planting is done with a tree planter owned by the local Soil Conservation District and manned by an experienced planting crew.

Work Unit Conservationist Donell Sylvester (left) studies a detail in the McGinley conservation plan. The chart (below) shows how the more productive grasses, the decreasers, are displaced by less productive species, the increasers, and weeds as a piece of range is overgrazed. "A conservation plan is basically a state of mind," says Jess McGinley (opposite page). "Consciously or subconsciously, you've got to be thinking about it every time you look at your land."



The Payoff

Has his conservation work really paid off? "I can't pull out the books and point to any dollar cents figures to answer that," Jess admits, "but I know that it is lots easier now for us to carry cattle along at all times of the year than it used to be. And our cattle are in better condition too. Also, it makes a fellow feel good to be able to look at a piece of range and know it's in better shape than it was when he took it over and that he is building something permanent and productive for his children and his grandchildren."

To which Dyksterhuis adds his particular Amen: "On ranges being managed to reach or maintain top condition, you may not see more livestock, but you will see more calves and lambs per 100 cows or ewes, and you will see heavier calves and lambs. There will be less trouble with weeds, droughts, grasshoppers, gullies, poisonous plants—and bankers."

Missouri Meerschaum

NO DOUBT THE FIRST corncob pipe was made by an Indian. Lacking his favorite clay pipe, he hollowed out a corncob, stuck a reed in one end, and had himself a cool, contented smoke.

Early American smokers from time to time made the corncob pinch-hit for the common hickory or clay pipe, but destiny singled out a Missouri Dutchman to make the first corncob pipe of commerce and establish the lowly cob as a respectable member of the pipe family.

Destiny also pointed a finger at a little Missouri River town as the scene for the drama of the so-called Missouri Meerschaum.

A thrifty farmer with the undistinguished name of John Scharnke, living near Washington, Missouri, for years had whittled out his own pipes from the fine large cobs of his bottom land corn.

The story of how Scharnke conceived his first corncob pipe is legend in Washington. One afternoon he was sitting and contemplating, where farmers customarily sit and contemplate. He had a corncob poised in his hand. "What a marvelous product the cob is," he thought to himself. "I use it for brushing down the horses, as fuel for the kitchen stove, and as a stopper for jugs. I sometimes scratch my back with it, and as a missile use it to chase the chickens out of the garden." Then, having left his old briar at the house and wanting a smoke, the idea of using it as a pipe sprung full-blown into Scharnke's mind. He started whittling.

The cob pipe knows no social barriers. General Douglas MacArthur's corncob shared his fame. At left, a rural smoker enjoys a Fancy Granddad, a lineal descendant of the Elizabethan clay pipe.

His good friend in the village was Henry Tibbe, a Dutch immigrant who operated a woodworking shop. One rainy afternoon as John Scharnke watched his friend turn out a spindle on his lathe, the thought occurred to him that here was a better way to dress down a tough cob for a pipe than by whittling on it with his jackknife. The next time he came to visit, he brought a half dozen cobs. Henry shaped up a cob in a jiffy, inserted a length of native cane, and handed it to his friend.

After John Scharnke left, Tibbe made a few pipes from the leftover cobs, strung them on a piece of binder twine and hung them in the window of his shop. They caught on at once, and Tibbe soon found himself neglecting his woodworking to make pipes.

He went to a friend who was a pharmacist and something of a chemist and between the two of them they worked out a method of rubbing plaster of paris into the pores of the cob to harden it and make it finish more easily. It was light and porous, like the popular and expensive meerschaum of the time, which led to its christening as the Missouri Meerschaum. Business boomed. Henry brought his son in as a business partner and the Missouri Meerschaum Company was incorporated in 1872.

The Tibbes enlarged the plant and operated the business until 1912 when the bulk of the shares was purchased by Edmund Otto, father of Carl, Edmund, Jr. and Robert, who own the business today. Carl is president of the business and works with Edmund. Robert, a St. Louis business executive, is a non-working partner.

Carl, a former lawyer, is the pusher, and a sharp businessman with a philosophical approach to pipes. "The corncob pipe is acceptable in the best circles," he says. "Why, just recently a man was seen smoking a Missouri Meerschaum in the Harvard Club in New York, and he wasn't thrown out."

Edmund is a great personnel man, getting top production from the hundred handpicked employees. Many of the artisans are women and there is a good number of second and third generation pipemakers in the plant.

The Missouri Meerschaum Company turns out 15,000 to 30,000 pipes a day for 250 working days a year. They have a growing export business, shipping their pipes to most countries outside the Iron Curtain. "We haven't been able to break into England since World War II," Otto explains, "because of the high protection they give their briar pipe industry. We don't export to Italy, but we have licensed a plant in Milan." Pipes are shipped abroad in wooden coffin cases, the most serviceable packing case on the market. They do not advertise; their pipes are sold by salesmen to distributors and jobbers.

The Ottos make big pipes, little pipes, pipes with straight, curved, square, round and filtered stems. They make a pipe with a bamboo stem which sold for 15 cents in 1898, when the Missouri Meerschaum Company pipes were awarded a medal at the Paris Exposition, and sells for the same price today. They make a deluxe job for the carriage trade which sells for $2. A big seller is a bone-stemmed straight pipe which has retailed for 25 cents for more than 85 years. They make a few hickory pipes, mostly souvenir numbers. An Indian peace pipe assortment includes hickory. All can be smoked and all can be used for blowing bubbles.

There are more than 50 separate operations in making a $2 pipe, at least 30 in the cheaper pipes. Most of the work is done by hand, but in the last four or five years some automatic machinery has been added. Since the corncob pipe industry is now virtually a monopoly for the Missouri Meerschaum Company, no standard machinery has been developed. The Ottos, with the help of a local machinist, have engineered their own automation.

The first step in the making of a cob pipe is to procure a

(*Continued on page* 114)

By John Jeffers

Cholera and Carelessness

The surest method to prevent a herd reaching the last stages of hog cholera (above) with the typical lack of leg control and swift death is to vaccinate all the hogs in the herd at or before six weeks of age (right).

IN RECENT YEARS, when hog diseases often have unpronounceable names, or even mysterious initials, farmers tend to forget the old, sure killer, hog cholera. And when cholera is forgotten it is most lethal.

With cholera rarely occurring after years of careful vaccinations in an area, one or two farmers may omit vaccination to cut costs—especially if hog prices are on the ebb. Before long there are fewer hogs that have been vaccinated than have not. Then hog cholera breaks into the area, and runs havoc through the unprotected herds, as happened in parts of Illinois, Georgia, Ohio, Indiana, Virginia, North Carolina and Iowa in the summer and fall of 1959.

Reliable men believe we can eradicate hog cholera—if hog farmers and veterinarians cooperate in a properly enforced program. The prohibition of the use of the live virulent virus is a major step. Of only slightly less importance is the enforcement of laws to check and control cholera, such as making it a reportable disease in every state, and rigidly enforcing state and federal laws to prevent the feeding of uncooked garbage or the shipping of cholera ridden hogs.

There are still 18 of the continental 48 states without laws to prevent the use of the live virulent virus in vaccination against cholera. This, in spite of continued pressure from thinking producers and veterinarians to ban the use of the live virus.

The live virulent virus vaccine protects against the occurrence of the disease in the animal vaccinated. So does the newer modified live virus vaccine. The difference is that a hog vaccinated with the live virulent virus is capable of causing the actual disease; such a hog can spread the disease, shedding the potent virus in urine, manure and saliva for several days after vaccination, and so risking the infection of nearby unprotected hogs. Occasionally, the vaccination has not protected hogs, and some, though vaccinated, have died of cholera. Some claim this happens less with the live virulent virus vaccine—but anyway it happens so seldom as to be unimportant.

Thirty states now restrict the use of the live virulent virus, and those 30 (31 including Alaska) now produce approximately 86 per cent of the hogs in the United States. Although as of August 31, 1959, 30 states have restricted (not outlawed) the use of live virulent virus vaccine, less than one-third of these states have outlawed its use. The rest have restricted its use with limited or specific exceptions. Indiana (producing 8 percent of U. S. hogs) and Kansas (1.8 per cent) are the major swine producing states left without restrictions.

Eradication

Having the laws is one step—enforcing them is quite another. Too often farmers are reluctant to admit they had cholera because too often the cause is simple—they did not vaccinate against it. Particularly the first farmer in an area to find cholera in his hogs is loath to admit he gambled and lost. Unfortunately, the price of losing is also paid by others. On September 4, 1959, a farmer in Bureau County, Illinois, found cholera in a lot of 120 hogs.

"That was Friday before Labor Day, so I couldn't sell them," he said. "The vet gave serum to the whole bunch on Friday night. That cost about $1.25 a head. I shipped 96 of them Monday night and they sold at Chicago on the Tuesday market. They weighed 185 pounds average, and I got top price. The other 24 were too sick or too light and I kept them on the farm. I lost 16 of them in the next week and I saw the rest weren't going to get any better. I loaded them and four died on the way to Chicago. They didn't sell too well."

When those 96 hogs went to Chicago, they left a trail of hog cholera virus wherever they set foot. Those 96 hogs were dripping virus-rich tears, virus-infected manure and urine, and virus-ridden saliva and nasal secretions. They infected every truck they traveled in, every pen they entered, the water bowls and the feed troughs, the alleys and the yards they used in Chicago.

The disease could spread from the feet of men (and flies) who walked where the hogs had trod.

When those hogs were slaughtered, perhaps 48 hours later, the job of spreading virus was far from done. The virus lives quite well, thank you, in a frozen pork cut.

That pork cut could have reached any town in the United States, from Albuquerque to the Alleghenies, perhaps three months later after a succession of freezers. If any raw pork, trimmed before cooking, was carelessly fed to a hog—it could produce hog cholera. This is the price we pay for negligence in enforcing present laws.

Vernon C. Johnson, then, is the exception in admitting his loss from cholera in 1959. Johnson, of Princeton, Illinois, said, "I've never had cholera before on the place in our 30 years here, and so help me this is the first year I haven't vaccinated.

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The HUNTER of Washabaugh County

Swift, perfectly-trained greyhounds are Herb Stoddard's only weapons.

By Charles R. Koch

HERB STODDARD CLAIMS he hunts for a living and ranches for a hobby. Herb contradicts himself, for he has made a very comfortable living for his family with his cattle since those days in 1914 when he trailed down from Miles City to the piece of range he has occupied ever since on the edge of the Bad Lands of the Rosebud Indian Reservation in South Dakota.

Yet, in a very important way, this salty old cowboy has made a living from hunting. Coursing his hounds has been for him an essential part of the good life.

The first time I saw Herb was at a cattle sale one day at Martin, South Dakota. The tight little sale barn was jammed from ringside to rafters with consignors and buyers. Martin is on the Pine Ridge Indian Reservation and the crowd was well sprinkled with stolid Sioux bucks attired in the monotonously drab jackets, trousers and battered, broad-brimmed hats which have become their costumes. The balance of the assemblage was made up of white farmers and ranchers, some in overalls, others in various degrees of Western attire. Among these, one in particular stood out like a rugged old Longhorn among a bunch of modern show steers. I had noticed him joshing with the auctioneer before the sale started and later, whenever there was a lull in the chant, I could hear his deep, clear voice booming out a row or two behind me.

He was tall. There were few in the crowd who could top his rugged, well-proportioned frame. He seemed agile as a cat as he moved about and as he gesticulated in his conversation; yet it was apparent that leathery face had felt the bite of at least sixty winters. His cowboy boots, stockman's trousers and Western jacket fit him with the ease that goes with long and pleasant association. His keen, grey eyes peered from beneath the brim of the largest and blackest Stetson in the place, and a black neckerchief, knotted on the side cowboy style, shielded his throat. Here was a flesh-and-blood character who might have stepped right out of one of Charlie Russell's canvases of life on the open range.

Eventually I was able to maneuver myself alongside this cowboy, and immediately I found the subject closest to his heart was hunting and hounds. Within a few minutes I had an invitation to come to the Stoddard ranch. And within a few weeks I was there.

Herb is no ordinary hunter. He has the customary collection of guns to be found in any ranch house, the inevitable .30-.30 carbine and a few shotguns. But the weapon of his choice is a dog rather than a gun. And the dog of his choice is the greyhound.

His quarry is the coyote, though jack rabbits, badgers, or a deer in season will do when the tricky wild dogs are scarce. There is a $7.50 bounty on coyotes in South Dakota, which Herb aims to collect; but he's not a bounty hunter. With him, hunting is pure sport.

"Coyotes aren't a real pest out here, anyway," he said that first night as we planned the morrow's hunting. "If you killed off the coyotes, the jack rabbits and gophers would darn soon ruin the range. The coyote's the best mouser that ever lived. Every time I catch one I cut him open to see what he's been eating—that's the only way to learn to hunt; find out what the critters eat, then you'll know where to catch them—and I've found as many as 14 of those little bobtail mice in one stomach.

"Even the professional exterminators don't really aim to kill off all the coyotes. They'd be pushing themselves out of reach of the biscuits if they did. Exterminating the coyote is like enforcing Prohibition. Nobody's really interested in making it work: if they were, the coyote would long ago have become as rare around these parts as the grey wolf."

We went to bed that night with the wind howling around the ranch house. We were hoping it promised some snow before morning. "Hunting's best when there's snow on the ground," Herb had said. "It makes it easy to pick up a trail; and cold weather makes the coyotes get out and hunt more themselves. Right now they have so much fat on them and such a heavy coat of hair they only need a mouse a day to keep them going, and they spend most of the time just lying around. If you try to hunt in warm weather you'll be liable to get disgusted like another gobbler (gobbler is Herb's term for any human male) who came out here and finally decided this isn't even good 'next year' country."

Sleep ended the next morning with a clanking from the basement as Herb shook the furnace and got a good fire going so Mom would be comfortable while we were off on the hunt. Sleep had ended, but not the night. It was still black as a buzzard's wing outside as we downed stacks of Mom's pancakes floating in honey. Speaking with all the experience of a long-suffering hunter's wife, she urged this visitor to "fill up because it might be a long time till dinner."

The coyote (above) is Herb's principal game. When Herb hunts alone he rides horseback, starting out at daybreak with his hounds at foot (opposite page). The dogs can pick up a trail by scent but once they see their quarry they hunt entirely by sight. At distances up to a mile they can outrun the coyote at a ratio of about 7 to 5. The coyote has greater stamina though, and if the chase is prolonged he has the edge.

When Herb hunts on his own range he usually goes on horseback with a half-dozen or so of his greyhounds crowding around the heels of his mare. But this morning he used his Jeep as he always does when he has company along, or goes farther afield.

"Wait here," he said, as I found myself smack up against the gate to one of the dog runs. In a minute or so he was back with the Jeep and as he swung around broadside to the pen I could see, in the headlight beams, the lithe forms of the dogs leaping over one another and up against the netting.

The Jeep is equipped with a specially-designed box which Herb built to carry the dogs. This box has an opening along the top of both sides just wide enough for the hounds to stick their heads through and the entire left side is hinged at the bottom so it can drop open to let the dogs in and out. The latch on this door is controlled from the driver's seat by means of a rope. When Herb sights his game and maneuvers the Jeep into position he pulls the rope, the dogs leap out and the chase is on.

When he opened the gate to the dog run the six hounds were out with a bound and up in their box like a bunch of kids piling into a school bus heading for home.

I climbed in beside Herb, and two gates and ten minutes later, just as the first yellow streaks of dawn had broken over the eastern hills enough to make it possible to distinguish the brindles from the reds in the pack, we stopped on the edge of the badlands to let the dogs out for a breather before beginning our serious hunting.

If I hadn't suspected it before, it was very apparent by this time that while a man might be able to call Herb Stoddard a cur --if he smiled right—he'd better make no such remark about one of Herb's dogs.

As he gazed off across the spectacular wastes at our feet, he mused, "Dogs that can catch a coyote down through there are quite a set of hounds. But these can do it.

"There was a gobbler hunting up here one time," he continued as the dogs, noses to the ground, gathered around a spot where a coyote had lingered during the night, "and his dogs weren't worth a darn. I finally told him, 'You must be the best hunter in the world 'cause you sure have the poorest hounds.' When we got back to the house he told Mom, 'Your husband must be the poorest hunter in the world, Mrs. Stoddard. He sure has the best hounds.' "

When hunting far afield or with companions Herb uses his Jeep (below). A specially-built box on the back holds six to eight dogs. They can be released as soon as the game is sighted by means of a latch controlled from the driver's seat. Jack rabbits are shifty runners and are sometimes harder to catch than coyotes. This one (above) was not quite fast enough. The dogs sprawl on the snowbank and lick the snow to cool off after a run. It doesn't take much to overheat a greyhound. After a good day's hunting Herb adds a few more pelts to his collection in the trees behind the ranch house (opposite page). They are worth $7.50 apiece in bounty in South Dakota.

The Stoddard hounds are of Australian stock, coming from a strain imported by John Pesek, of Ravenna, Nebraska. Pesak, a wrestler, went to Australia a few years back to match headlocks and half-Nelsons with the Aussie matmen. When he came home he brought with him a greyhound called Pacific Dream reputed to have cost him $12,000. Most of the dogs Stoddard courses today are grandsons and granddaughters of Pacific Dream.

Herb has been running dogs for more

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BOOKS that tell STORIES

By George Laycock

SLENDER, FAST-MOVING Harold Hawley, an economist by training and a farmer by choice, has his own idea of what constitutes his most important farm tool. It's not his new self-propelled combine, his tractors nor the other mechanical devices around the place. It is instead a handful of penciled notes in his pocket and a detailed and accurate farm account book in his parlor.

Hawley's books are perhaps the most revealing kind of records a farm operator can maintain. He needs little else to diagnose any ailing spots in his farm operation, or to point out which are the most profitable practices for his stock and crops.

Among other things, his bookkeeping has guided him in steadily expanding his farm holdings in the rolling dairy country near Weedsport, New York. The land he works today once covered most of eight farms. His father's old place, plus three adjoining farms, make a 500-acre block. He owns one and rents two other farms and in recent times has been buying about one farm a year. He has bought all of his land and set up his modern farming practices within the past 15 years.

Lorna and Dutch Johnson (above) work on their cost accounting books in Illinois. Occasionally they compare their cost of production figures with those of Harold and Doris Hawley in New York. Dr. Hawley (opposite page) is one economist who puts his theories to practice. He knows the cash and labor cost of every item produced on the farm and uses them in planning. By buying fertilizer early, in high analysis, and for cash he saves 50 per cent of the late, credit-buyer's cost.

The big cash crop on the Hawley farm is milk. He keeps a milking herd of 65 to 70 Holsteins to produce it, and uses his books to find new ways to make money in dairying.

Then, Hawley uses his records to help him produce, more profitably, the crops with which to feed his cows. He aims to raise all the roughage feed his stock needs. To the cash market he sends grain from 44 acres of wheat, 60 acres of oats and 110 acres of corn. He also grows 30 acres of corn for silage, 25 acres of winter barley, 125 acres of hay and 25 acres of rotation pasture.

And every one of these crops, as one might suspect, gets the full treatment in Hawley's revealing records.

There are, of course, numerous ways of keeping farm records, everything from a nickel notebook in the bib pocket of a pair of overalls to the meticulous work of a hired CPA. The principle of Hawley's system is as simple, according to Hawley, as it is sensible. He wants to know exactly what each of his farm enterprises costs and what it returns. And he wants none of the costs hidden, misplaced, forgotten or ignored. He breaks his record-keeping down first by enterprises, and for each of these he has a labor and cash account. There are, for instance, separate accounts kept on: equipment, tractor, truck, automobile, operator's house, tenant's house, all other buildings, fences, water system, cows, heifers, herd bull, last year's crops, hay, grass silage, corn silage, corn for grain, winter barley, oats, wheat, and next year's crop. The same holds true for crop land, pasture, woods, interest account, telephone and electricity, insurance, taxes and general expenses, feeds and supplies, gasoline, oil, fertilizer and lime, manure, rented land, accounts receivable, accounts payable, net worth, loss and gain. It's little wonder that Hawley is a valued cooperator with Cornell University's Ag Economics Department in his record keeping. Hawley said, "The College closes my books and analyzes my accounts and summarizes the results along with those of other cooperators and I certainly appreciate the chance to work with the project."

How far will Hawley go to be sure his figures represent exact production costs and returns? You begin to get the picture when you watch him stuff penciled notes into his pocket while he's hauling manure to land that's going into corn in the spring. First, he credits the cows with the value of the manure, because it's a product of value which they produce. Then he charges the corn crop with the cost of the manure, the cost of tractor operation for hauling it and the cost of labor required to complete the operation. This, says Hawley, is simply a matter of business conducted as any successful business should be.

It's not surprising that Hawley's active brain works like Exhibit One for the product from a college department of agricultural economics, for that is precisely what Harold Hawley is. In 1931, when Hawley left the home farm he went to Ithaca and enrolled

at Cornell. From there he went to Lafayette, Indiana, for graduate work in Purdue's College of Agriculture.

By this time he had developed a keen interest in farm economics. He kept at his graduate work in agricultural economics until he earned his master's degree and then his doctor's degree.

It was while he was doing graduate work that Hawley met his wife, Doris, who came from Wyoming to get a master's degree in home economics and, according to Harold, is the brains of their farm operation and just as demanding about the bookkeeping as Harold himself. "I want to farm effectively and successfully," Hawley said by way of explaining his devotion to his record books, "and the only way to do this is to know where you stand all the time on all your farm operations. You can't really take pride in your operation if you don't know how you're doing."

While he was in graduate school, Harold also met a strapping, big, tow-headed animal husbandry student by the name of Lavern Johnson, the pride of Purdue football fans about that time. Among other things, Johnson and Hawley talked of the rapidly changing methods in the world of agriculture.

Johnson went back to the land after he left school. He took over the farm his father had operated near Sandwich, Illinois.

Hawley, meanwhile, finished school and, with his degrees to his credit, went to work for Swift and Company as a price analyst. He lost track of Johnson, who is known in his home community as "Dutch," until one day he was talking with a man who turned out to be Dutch's brother-in-law.

Hawley called Dutch and asked if he might come down from Chicago Saturday and do some rabbit hunting. It felt good to Hawley to be around a well-run farm operation again. He did a little rabbit hunting and considerable talking with Dutch about farming and it wasn't many Saturdays until he was back again.

Dutch suggested that Hawley help with the farm bookkeeping on Saturdays. The idea fascinated the Chicago office worker.

The more often he visited the Johnson farm the less Hawley was satisfied with his desk job. Dutch was doing what Hawley really wanted to do. "He sure got the farming fever," Johnson said.

Hawley still didn't know how he planned to cure this fever. Then he went back home to Cayuga County, New York, for a visit, and when he returned to Chicago he had purchased the farm across the road from his father's place. He and Doris had made up their minds to go home and farm. That was 15 years ago, and they've never regretted it.

It's not particularly surprising that one of the first jobs Hawley set himself in his new farm business was to lay out a sound plan for keeping farm accounts. His years of school, his business experience and, more recently, his work on Johnson's books prompted this. He turned to Cornell's Department of Agricultural Economics for help and was soon enrolled as one of the complete farm cost

(*Continued on page* 127)

BOOKS that tell STORIES

Cost accounting is helping these two farmers make a maximum profit from their Illinois corn and hog farm and New York dairy. Meticulous records of labor used and cash spent are kept separately for each project on the farm. Labor is charged at the going rate; where a farm product is used in another farm enterprise—such as feed for cows—it is charged to the cows at the market price or the price of production, whichever is the higher. In this way a man doesn't give himself a "good buy" on corn to show a profit on hogs. These two friends compare production figures in a friendly rivalry and compare their general records with other record-keeping farmers in their states. Such comparison shows areas where they can improve and keeps them on their toes.

Silo Care

A SILO, LIKE A TRACTOR, is a piece of machinery that can be kept in usable condition longer if it is properly maintained. Immediately after the silo has been emptied comes the time when work on your silo may and should be done. The inside maintenance *can* be done as the silo is being emptied.

Both weather and silage wear silos—weather a little on the outside, silage sometimes a lot, on the inside. The wear caused by silage depends on the wetness of the silage, the length of contact between silo and silage, and the kind of silo. The wetter the silage the greater the wear, as the liquids reaching the silo carry the corrosives.

Weather has the most effect on wood silos, less on steel, and little or none on concrete, or tile silos. Silage has the least effect on wood and tile silos, and more on concrete and steel because the last two are more susceptible to the corrosive substances in silage.

Silage acts most on any part of the silo where unprotected portland cement is exposed. Silage has little effect on steel as long as steel and silage only are in contact, but once air gets to the steel, the oxygen of the moist air will rust the iron rapidly.

Vitrified clay blocks or tile will remain chemically unaffected by silage almost forever. Unprotected portland cement mortar, however, will ultimately wear out.

Wood Silos: A wood silo can be kept moist by keeping silage in it, especially during the summer months. Otherwise a hot, dry summer can cause shrinkage of the staves. A penetrating wood preservative like creosote brushed on doors and door frames when they are air dry will prolong their life. The outside paint on wood silos should be porous enough to let the moisture evaporate through the paint itself. Water-emulsion paints for outside use serve well for this purpose. A silo made of pressure-treated wood will serve for many years with almost no attention to the wood, the only care needed being attention to the doors and silo hardware, painting it or replacing them as necessary.

Steel Silos: When the protective coating on a new steel silo has succumbed to the action of silage the interior protection should be renewed. The iron must be protected on the outside. Condensation on the inside must not reach the iron. Each manufacturer has his own preferred protective coating which should be used when necessary. When that internal coating is glass bonded to steel, the whole plate must be replaced.

Tile Silos: Masonry, or tile silos that are well built, will only need occasional repair to the joints. Care in building is most important here. If, when laying the tile the whole of the space between the two tiles is filled with the bonding agent, a much more lasting joint will result. When there is merely a thin strip of mortar or mastic at the inside and outside of any joint with none in the middle, construction may be faster and cost less, but the life will be greatly shortened.

Concrete Silos: These are the most numerous. They also vary most in quality; and hence are the ones now most likely to need maintenance, repair or restoration. Proper maintenance can postpone almost indefinitely the need for repair or restoration of a concrete silo or mortar joints in other silos. The cement gives the concrete its strength, but is susceptible to wear and corrosion by silage. There are some new protective coatings now being put on new concrete silos that protect the concrete and add to its strength. These stick to the concrete and hold together so well as a coating that they become part of the silo.

Such a coat may be a portland cement and sand wash, or brush coat. A "plaster" lining of cement and sand can be durable. These coats usually are made of a mixture of two parts of sand to one of cement. Most important, these coats must be properly cured before they dry. If this happens, plaster coats become about the best inside finish for a concrete silo. The weakness of plaster lies in the difficulty of keeping the coat wet for the seven or eight days needed for full setting of the cement. If the coat dries during this curing period and remains without water for a matter of *four or five minutes* its quality is enormously lessened. A brush coat must be kept damp for the full curing period and in a vertical wall of a silo it is hard to do this, as the surface is large and the coating thin. Evaporation causes a large loss of water. A new plastic spray which keeps the moisture in the coat can be put on immediately after the coat is applied. The difficulty is getting the spray on fast enough and preventing the spray from reaching parts of the silo which have not yet been coated. The cement coats will not stick on concrete partly covered by the sprayed on moisture-holding membrane.

Materials now being used to protect the inside of a silo are: the epoxies, the furfurals, and polystyrenes. Some of these materials are glue-like bonding agents which soak into the concrete and keep the silage juices out. When silage juices move into concrete the corrosive substances in silage go along. The corrosives (which are usually, but not always, acids) slowly destroy the bond of the cement with the sand and gravel of the concrete.

Any protective material for used concrete

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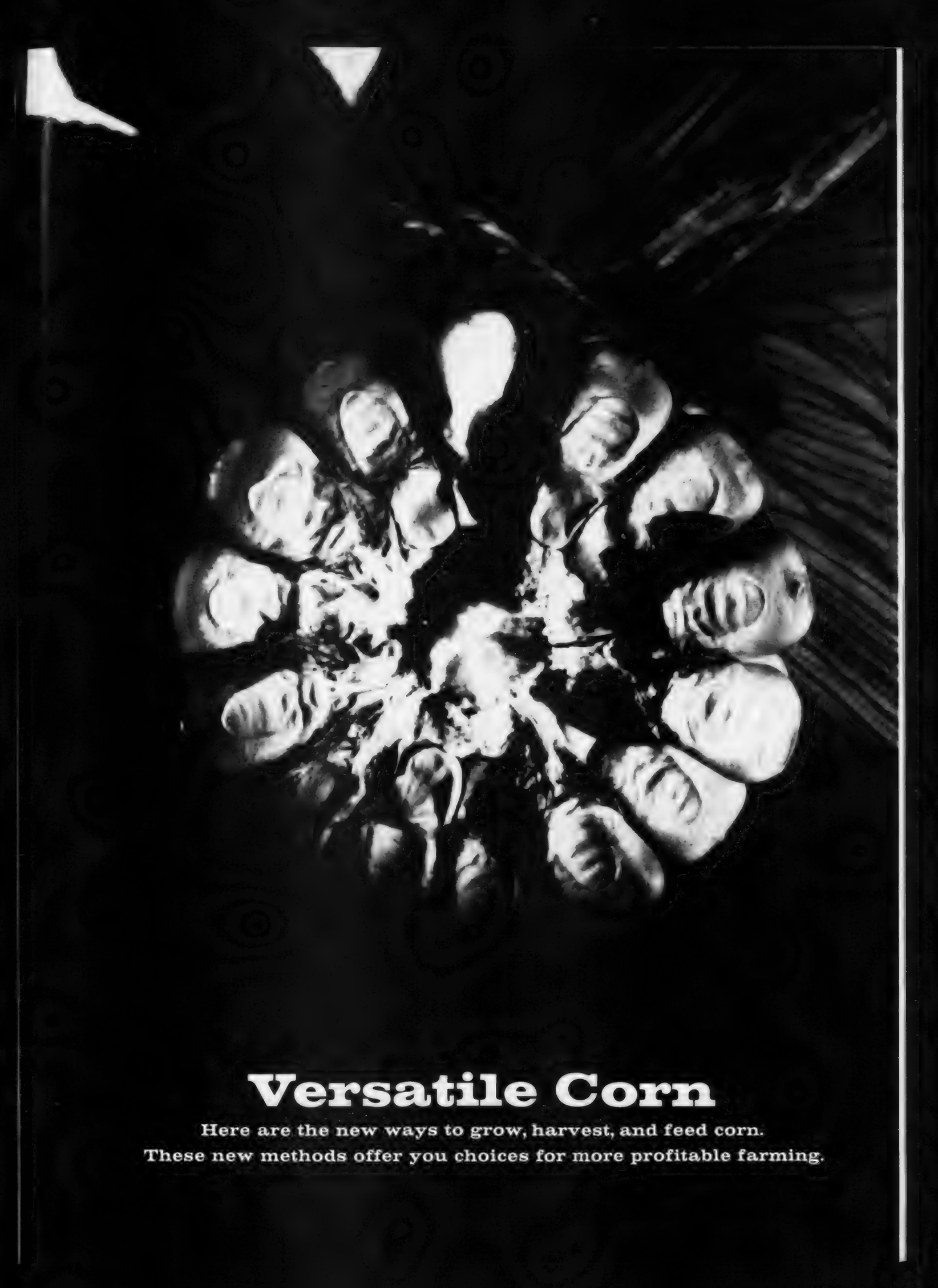
A Personality Test for Silage Makers

"I can ask a man ten seemingly screw-ball questions and tell by the way he answers them whether he can make silage in a trench or bunker silo or whether he ought to use the upright, tower silo," an expert told us the other day. If you want to check yourself, here are his ten queries. Answer each "yes" or "no." His answers and interpretation of them are shown on page 139.

1. Can you use a shovel equally well over either shoulder?
2. Have you cut or badly bruised your hands this year?
3. Would you drive to visit a neighbor who lives a quarter mile away?
4. Do you prepare a shopping list before you go to town?
5. Would you undo and retie your tie if you found the narrow end was longer than the wide end?
6. Have you checked the tire pressure in your tractor tires within a month?
7. Have you recently changed plans for field work after hearing a weather forecast?
8. Have you ever collected on your accident insurance?
9. Do you grease your machinery exactly as the manufacturer recommends?
10. Do you shave every day? (be honest, now.)



Versatile Corn

Here are the new ways to grow, harvest, and feed corn.
These new methods offer you choices for more profitable farming.

Versatile Corn

New methods of raising, storing, and feeding corn are giving farmers greater scope in their planning.

IN THE OLD DAYS corn took off in one direction in a simple and direct flight. From the grain of seed, to the crib, to the hog, and finally to the market, a farmer could count on just about everything but the weather. Today corn takes off in all directions.

From a rather rigid crop in the old days fed as ear corn chiefly to livestock, corn has become one of our most versatile crops; but with this versatility have come complexities in seed production, growing, harvesting, storing and feeding. Economics, too, have become complex—sometimes the most important angle of corn production.

Take the production of seed. In the good old days a farmer saved his best ears and shelled them by hand, carefully rejecting the small grains on the silk end and the off-shape grains at the butt end. He sacked the shelled seed and hung the sacks out of the way of the rats and planted it in the spring with a prayer for good weather. In the slow course of time his annual selection of the best ears produced better corn: a little better, but not much.

How complicated today is the once simple matter of seed. The production of seed has left the farm and gone to great commercial seed factories, turning out new models each year. We now have a seed for every variety of soil and climate. These have become so selective that corn for County A is, maybe, way out of line for County B. We have 95-day corn, 130-day corn; we have corn for sandy soil, corn for clay soil; we have corn for wet years and corn for dry years; we have corn for north latitudes, corn for south latitudes; and we have silage corn, corn for pickers, low ears, high ears, bush corn, tall corn, short corn; corn that will resist wind, corn that won't. If a farmer wants to specialize, there is seed for glucose corn, plastic corn, corn for syrup, even corn heavy on cob for corncob pipes. Some of these are not available to all farmers; some are being developed.

The farmer is often bewildered in making a choice of the many varieties available to him. He usually leaves that to the seed corn producer who recommends a particular variety for his individual geography and soil, and he hopes for the best.

It appears that as science adds improvement and refinement to the production of corn, it also adds complexity and higher investment. However, these things have not come suddenly, but one at a time; and the farmer has adjusted to each one in an orderly fashion. Each improvement brings a new decision, and as improvements multiply, so do decisions, often in geometrical ratio. For example, a decision to install an irrigation system brings in its train a whole complex of decisions. The grower must decide which of several types of systems to install, depending on water supply, soil, topography and labor supply; he must decide on how much to increase the population of his corn crop, the method of fertilizer, and the type to use.

If he decides to depart from the traditional method of feeding his greatly increased corn production, he must make still more decisions—how to harvest, store, dry, and the type of feed—wet corn, shelled corn, corn and cob silage, whole plant silage, and/or a mixed feed. He must give a thought to a livestock increase, to labor supply, very likely to an automated set-up.

Take the development of planting techniques. A good deal of corn was planted in this country with a hoe, and before that with a sharp stick. Even when machinery came along, our grandfathers got along with a mighty small investment. A team of horses raised on the farm, a breaking plow, a harrow, a two-row planter actuated by a wire stretched across the field, a cultivator, a corn knife, and a husking peg. A few hundred dollars would cover it all.

Today a farmer needs a tractor, a two-bottom plow, a disc and a planter merely to get his corn in the ground. This adds up to a minimum of $4000 for even a small field of corn. If he grows corn on big acreage, he will have to add tractors, multiple row planters and cultivators, and multiple bottom breaking plows. For 200 or 300 acres of corn the investment may well go to $25,000. To the four or five simple pieces of machinery once required, we add at least a dozen more today when we go beyond the planting to the harvesting, storage and feeding. The once simple plow, planter and cultivator have developed into expensive power tools. And a host of new machines have been added—insect and herbicide sprayers, pickers and shellers, dryers, self-unloading wagons, silage cutters, silo unloaders and automatic feeding machinery, power tools to handle manure, elaborate feed mills. These not only add up in cost to a total that places the corn farmer in the rich man's class as far as costs go, but they increase the necessity for more scientific information and the necessity for decisions at every turn. All put together, they have made a businessman and a practical scientist out of the farmer.

Once the popular method of planting corn was to check it so the field could be cultivated both ways. Now corn is almost all drilled, and the little matter of population in the field has become a great big problem in moisture supply, irrigation and fertilization. It was simple enough to drop 3 grains in a hill in the old days with a sort of understanding with Mother Nature that it would be quite all right if only two fine stalks were produced. There wasn't much variation of this population which amounted to some 9 or 10 thousand to the acre. Operating on the theory that there was a lot of soil going to waste, experimental populations have been increased to as high as 24,000 plants to the acre. This requires more moisture which in turn usually requires irrigation. A high population also requires more fertility in the soil, and this brings up the fine question of balance of fertility, moisture and sunshine, for in the last analysis, the population is limited by the amount of sunlight that can reach the leaves of the plant.

Some of the new techniques that have

(*Continued on page* 143)

Corn can still be shelled by hand or by hogs as it once was, but today picker-shellers and combines separate cob from grain in the field as it is harvested. When the sheller is used at the crib (right) flying chaff make a scene like a Seurat painting.

New Ways to Grow Corn

Faster, easier methods of production and sustained high yields are reducing the production cost of corn.

By Chester Charles

IN LESS THAN A DECADE agricultural science and farmer ingenuity have explored a score of new and fresh directions in corn culture. Now a corn grower can choose the methods that suit him best and offer the greatest chance of profit for him. Each season, the choices are expanding.

Fertility comes first. There is no single answer for every soil. Soil tests and tissue tests are the only reliable means of determining the kind and amount of fertilizer needed. Consider the crop requirements. A 100-bushel corn crop, with only the grain removed, takes about 35 pounds of phosphoric acid and 25 pounds of potassium per acre. If those levels are maintained in the soil by equal amounts of applied fertilizer, corn nutrients are likely to be adequate. The nitrogen is more variable. Two pounds of N for each bushel is a good rule of thumb, but there are no strict rules as to when and how this should be applied.

The farther north you are and the cooler the soil at planting time, the more important is a starter fertilizer. Most authorities agree that 200 pounds of a standard analysis fertilizer like 5-20-20 is about as much as should be used in the row. Amounts above that should be broadcast or side-dressed. Corn is quite tolerant of acidity. Reasonable applications of lime in a rotation will satisfy the calcium needs.

Corn management has changed and so have the farm laborers. Cultivation (left) is often reduced to a single, fast trip over the middles by the farmer's daughters or has been eliminated by the use of sprays. The many-times-over system of plowing and land fitting and planting is being replaced. The once-over plow plant method (above) uses a single-row planter offset from the three-bottom plows to space the row at 42 inches.

Are you considering continuous corn? Nitrogen is the key. Where adequate nitrogen is supplied, yields can be kept up. Without nitrogen, continuous corn drops to yields that are not worth harvesting after six to eight years. So far as is known, at least four years of continuous corn can be profitable on most soil types except those subject to erosion because of steepness. A pound of nitrogen is a pound of nitrogen whether it is in a bag or in solution. So it is with other fertilizers. Liquid fertilizer, mainly, is just easier to handle.

Seed Choices

In Illinois alone, there are a staggering 500 corn varieties from which to choose. Earl R. Leng, University of Illinois corn specialist, advises: "Corn seed is sold like no other merchandise. A farmer will drive many miles to buy a tractor or a bull. But he waits for a seed corn salesman to look him up. He is likely to buy whatever seed his neighbor sells, regardless of source. In my estimation, the safest decision is to spread the risk by buying from several producers. Some growers prefer to mix seed of varied maturity dates, not over five days apart. This lengthens the period of pollen release, with more chance of proper weather at the time. I am not convinced that the practice is wise, for uneven ripening may be a problem later."

According to Ray Snyder, pioneer corn breeder of Yellow Springs, Ohio, quality hybrids result from careful production. Inefficient detasseling, for example, causes self-pollination. A portion of the resulting seed is not hybridized and is no better than home-grown seed. Fast seed drying at high temperature can hurt seed germination. The effect is weak plants in addition to low germination.

Adapted hybrids, with desirable maturity dates, must be chosen. Good ear height for picking, good shelling ability for harvesting with a picker-sheller, are other factors to be considered. Hybrids differ in their moisture content at harvest time, their ability to withstand lodging, and a host of other traits that are tailored for different local conditions. Farmers east of the Mississippi and south of U.S. highway 40 should select blight-resistant hybrids. Leaf blight, a fungus spread by windborne spores, can cut corn yields materially. Southern farmers favor double-eared or "prolific" hybrids; farmers in winter-wheat sections are given a choice of short season hybrids for fields to be harvested in time for wheat seeding before cold weather. Where extensive acreage is planted, it is wise to vary the maturity dates of the hybrids chosen, for more orderly harvest at proper maturity.

Silage use calls for tall, high tonnage corn; since lateness goes along with tallness, a long season hybrid is indicated. Late hybrids for best yields are also preferred for artificial drying or for wet corn storage. Dwarf varieties are still trailing in yield as grain or silage. With them, harvesting as grain is often difficult. The 1959 experiences were mostly disappointing. Better wait, or

(*Continued on page* 118)

USE
SETS THE PATTERN

The choice of methods of harvesting and storing corn is determined by its ultimate use.

WHEN THE ONLY METHODS of harvesting corn were ensiling or shocking and the silo and the crib were the only choices in storage facilities the only decision the farmer had to make was between making silage or cribbing the corn. If he ensiled it, he fed it to his cattle. If he shocked it and later cribbed it, he could feed it to any of his livestock or sell it to pick up some cash.

Today it is quite a different story supported by a vastly increased investment in machinery and equipment and producing a very appreciable difference in net income depending upon ultimate utilization of the crop.

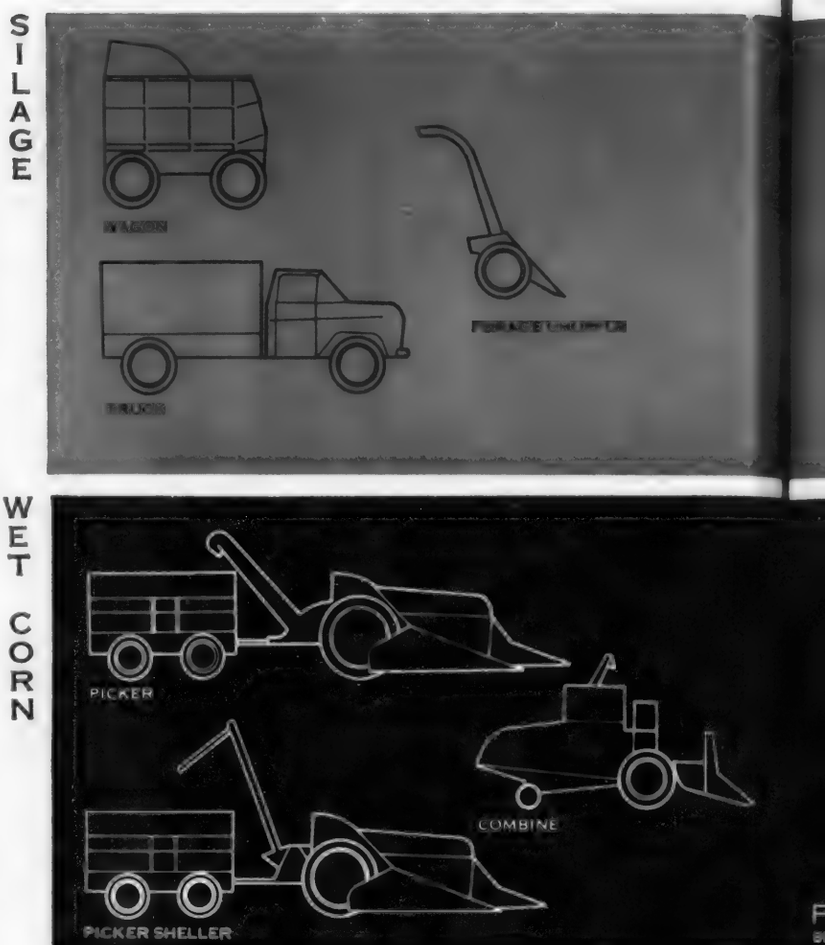
In fact "ultimate utilization" is the key to the size and scope of the corn grower's entire operation, particularly in the harvesting and storage departments. This is one field where it now is essential to work backwards. First the grower must determine how he intends to finally dispose of the crop. Then he fits his equipment to this end.

The man who buys a corn combine, or a picker-sheller, for example, and puts his crop in a sealed silo as high moisture shelled corn, closes the door to the cash market the minute he starts his picker-sheller down the field. The man who puts up his crop as whole plant silage, or as ear-corn silage, restricts himself to feeding cattle, or possibly sheep, and takes himself out of the swine or poultry business.

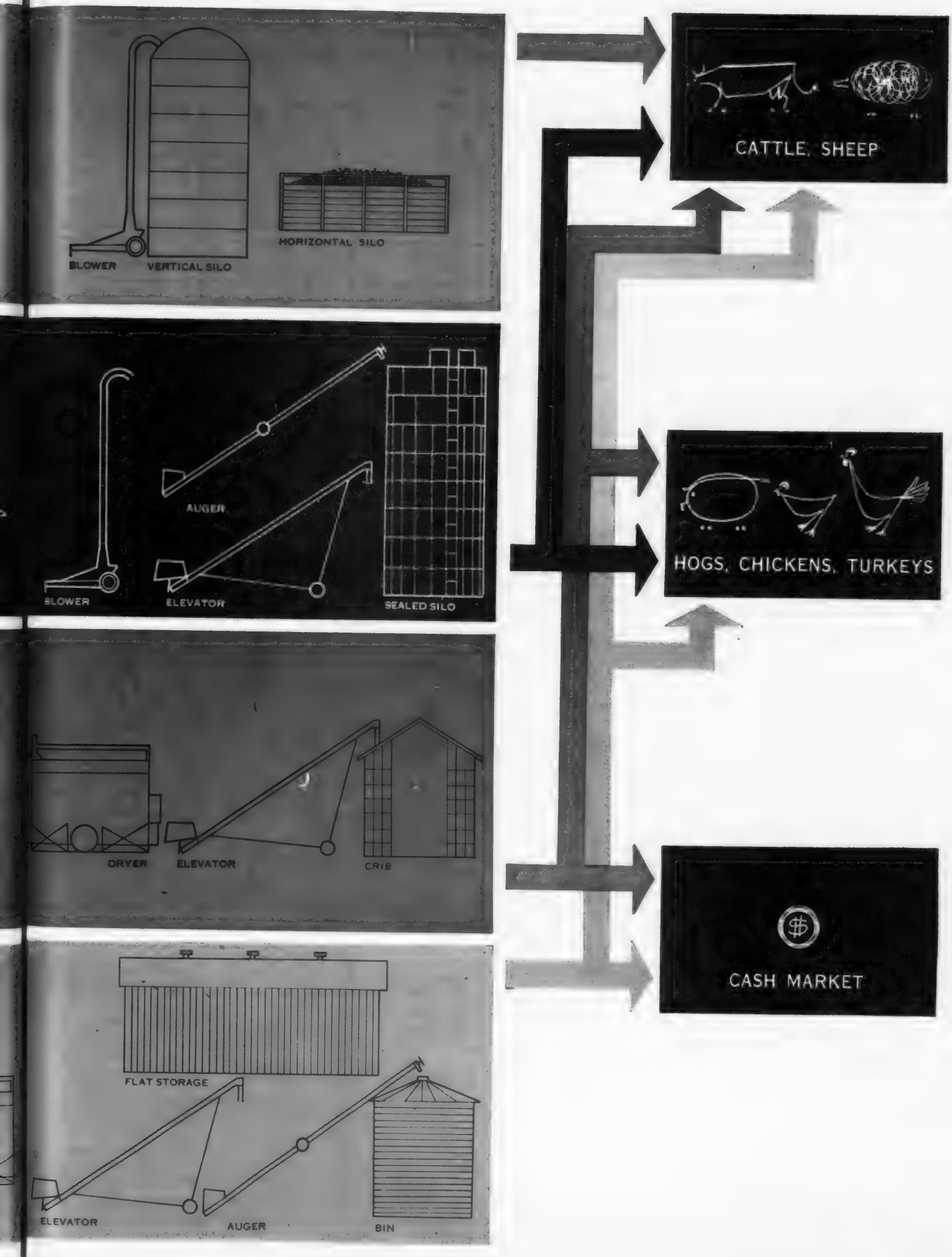
The chart on these two pages graphically details the outlets open to the corn grower, the equipment and machinery required to achieve these various ends and the restrictions he must accept after he has selected any particular method of storage. As has already been pointed out, if he makes silage, he cannot expect to feed hogs or sell on the cash market. If he puts the crop in the crib or in bins or flat storage, he can go any direction at all in disposing of it. He can feed cattle (or sheep), hogs, poultry, or sell on the cash market.

Again, the type of storage he selects determines the kind of

(Text continued on page 86, related charts on pages 84 and 85)



Alternative Methods of Harvesting and Storing Corn—The chart shows the four current methods for handling corn. The arrows at the right indicate the ultimate use to which the crop can be put after it is handled in any of these ways. Putting it up as ear corn or as dried shelled corn gives the grower the greatest flexibility. As the arrows indicate, he can then use it to feed any kind of livestock or sell it on the cash market. Once he puts it in a silo he restricts himself to livestock feeding. The high moisture shelled corn can be fed to cattle or hogs; but the ground ear corn silage and whole plant silage can be utilized only by ruminants like cattle and sheep. The pieces of equipment shown in the chart are alternatives for each of the four methods. For example, a picker, a picker-sheller *or* a corn combine can be used to harvest for storage as wet corn, and the corn can be put in the silo by means of an elevator, an auger *or* a blower; whole plant silage can be stored in a vertical *or* a horizontal silo; a drier may be necessary when corn in put in a crib, bins *or* flat storage; an elevator *or* an auger can be used to fill the bin, etc.


BLOWER
VERTICAL SILO
HORIZONTAL SILO
BLOWER
AUGER
ELEVATOR
SEALED SILO
DRYER
ELEVATOR
CRIB
FLAT STORAGE
ELEVATOR
AUGER
BIN
CATTLE, SHEEP
HOGS, CHICKENS, TURKEYS
CASH MARKET

Corn Harvesting, Storage and Utilization Guide

Values are given for 50 acre units of corn (4000 bushels)

A. Harvesting Costs	Whole Plant	Ear Only		Kernels Only	
	Silage	Ground Ear Silage	Ear	Whole Kernel Silage	Kernel
	$ per Yr.	$ per Yr.	$ per Yr.	$ per Yr.	$ per Yr
*1. Harvesting Machine (fixed annual cost)	240	304		S.P. Combine 653 Picker-Sheller 425	
1a. Power, Fuel & Repair Cost for Harvester	104	76		S.P. Combine 71 Picker-Sheller 85	
*2. Hauling Equipment — 3 Wagons (fixed annual cost)	195	60		60	
2a. Power, Fuel & Repair Cost for Hauling Equipment	65	46		46	
*3. Elevating Equipment (fixed annual cost)	108	140	46	86	46
3a. Power, Fuel & Repair Cost for Elevating Equipment	66	61	4	53	4
4. Labor Cost ($1.50/hour)	282	225	150	225	150
5. Harvesting Loss ($1.00 per bu. corn)	100				
5a. Shelled Corn Lost — Kernel Moisture 30%		100	100	200	200
25%			200		300
20%			300		400
5b. Ear Corn Lost — Month When Harvested					
September		100	100	100	100
October			200		200
November			300		300
December			600		600

B. Storage Costs	Vertical Silo	Other	Vertical Silo	Metal or Wood Crib	Vertical Silo	Metal or Wood Bin
1. Structure	1170	292	480	400	360	400
2. Storage Loss	525	702	253	152	247	72

C. Feeding Costs						
*1. Unloading Equipment (fixed annual cost)	276	?	142	?	142	?
1a. Power, Fuel & Repair Costs	81	?	18	?	14	?
2. Equipment & Labor for — Shelling				190		
Grind & Mix				532		403

D. Feeding Value Gain						
1. Stover Feed Value (Beef and Dairy)	1490		1490			
2. Cob Feed Value (Beef and Dairy)	610		610		610	610

*These costs remain fixed for any acreage up to 150.

E. Drying Costs		SAFE STORAGE AS				DIRECT MARKETING AS			
		Ear 18%	Field Shelled Corn 12%			Ear 15.5%	Field Shelled Corn 15.5%		
1. Drying Equipment Method *		B	C	C	C	D	C	C	C
2. Investment for Equipment		$1200	$2000	$3000	$4500	$2000	$2000	$3000	$4500
3. Fixed Annual Drying Costs		$ 108	$ 260	$ 390	$ 585	$ 212	$ 260	$ 390	$ 585
4. Power, Heat, Labor	Kernel Moisture 30%	¢/bu 3	¢/bu 7.7			¢/bu 4	¢/bu 6.1		
	27½%	2	6.2			3	4.9		
	25%	1.5	5.2			2.5	3.6		
	22½%	1	4			1.5	2.7		
	20%	.5	3			1	1.8		

* Description of Drying Methods:

Method A—Narrow crib, 4½′ to 5′ wide can take corn up to 28 per cent moisture if shelled corn is removed. Since no drying costs are involved in this method none are listed in the table.

Method B—Ventilate a crib with unheated forced air.

Method C—$2,000—Small batch dryer with heat. Heat furnished from space heater.
$3,000—Small capacity commercial batch dryer.
$4,500—Large size commercial batch dryer.

Method D—Same as B but using a portable space heater to add some heat to the air.

F. Marketing Costs — NET MARKET DISCOUNT COST PER BUSHEL				
1. Market Discount Rate	Cents Market Discount per Each ½ per cent Moisture Above 15.5 per cent Corn			
Kernel Moisture %	1¢ Straight	1½¢ Straight	1¢ up to 17.5% 1¢ 17.6% - 20% 2¢ 20.1 and Above	1½¢ up to 20% 2¢ 20.1 and Above
30	11.8	26.3	34.3	36.3
27.5	10	21.8	27.3	29.3
25	7.8	17.4	20.3	22.3
22.5	5.7	12.7	13.2	15.2
20	3.7	8.2	6.2	8.2
15.5	0	0	0	0
12.5	3.4	3.4	3.4	3.4
10	6.1	6.1	6.1	6.1
2. Hauling to Market — Ear Corn	8 cents per bushel			
Shelled Corn	5 cents per bushel			
3. Shelling — Ear Corn Only	5 cents per bushel			

G. Other Factors

1. **Capital Investment Required** — Silage may require extremely large investments. Ear corn results in lowest investment, particularly if present storage facilities on the farm are adequate.
2. **Availability of Labor** — Silage requires additional labor for it must be made at the proper moisture content.
3. **Ease of Doing** — With modern equipment, each method of harvesting can be done with a minimum of human effort.
4. **Flexibility of Use** — Ear corn is most flexible method of harvesting. Storage is relatively simple compared to other methods.
5. **Management Skill Required** — Making good ear and shelled corn silage requires more skill than whole plant silage. Using drying facilities properly requires care.
6. **Market Price Fluctuation** — Selling on the most favorable market may result in 10¢ per bushel or more premium.
7. **Effect Upon Subsequent Crops** — Disking stalks into the ground requires more power and labor than without them. Late planted wheat after corn may give disappointing yields.
8. **Ability to Convert into Cash Rapidly** — Silage must be fed largely to beef or dairy. Ear and shelled corn can be sold at any time, particularly if drying facilities were used.
9. **Manure Values** — Actual dollar value of manure is difficult to determine, but the beneficial effect is well known.

Cost Examples from Corn Guide

EXAMPLE 1: BEEF OR DAIRY FARMER — Description: Mounted picker, picker sheller or field chopper; vertical silo. Mechanical drying w/o heat for ear corn. Heated air drying to 12% for shelled corn ($3,000 investment). Average harvesting moisture 30% silage, 25% for grains. October harvest for grain. September harvest for silage.

Item	Whole Plant	Ear Corn Silage	Ear Corn	Shelled Corn Silage	Shelled Corn
HARVESTING					
Machine	$ 240	$ 304	$ 304	$ 425	$ 425
Power, etc.	104	76	76	85	85
Hauling Equip.	195	60	60	60	60
Power, etc.	65	46	46	46	46
Elevating	108	140	46	86	46
Power, etc.	66	61	4	53	4
Labor	282	225	150	225	150
Loss	100	200	400	300	500
STORAGE					
Structure	1170	480	400	360	400
Loss	525	253	152	247	72
FEEDING					
Equipment	276	142		142	
Power, etc.	81	18		14	
Grind & Mix			532		403
DRYING					
Equipment			108		390
Fuel & Power			54		182
FEEDING VALUE GAINS					
Stover & Cobs	-2100	-610	-610		
Total Relative Costs	$1112	$1395	$1722	$2043	$2763

EXAMPLE 2: HOG FARMER — Description: Mounted picker or picker sheller. Mechanical drying for ear corn w/o heat. Heated air drying for shelled corn ($3000 investment). 30% moisture for shelled corn silage, 25% moisture grain. Grain harvested in October. Vertical Silo.

Item	Ear Corn	Shelled Corn Silage	Shelled Corn
HARVESTING			
Machine	$ 304	$ 425	$ 425
Power, etc.	76	85	85
Hauling	60	60	60
Power, etc.	46	46	46
Elevating	46	86	46
Power, etc.	4	53	4
Labor	150	225	150
Loss	400	300	500
STORAGE			
Structure	400	360	400
Loss	152	247	72
FEEDING			
Equipment		142	
Power, etc.		14	
Shelling	190	—	
Grind & Mix	532	—	403
DRYING COSTS			
Equipment	108	0	390
Fuel, Oil, etc.	54	0	182
Total Relative Costs	$2522	$2043	$2763

EXAMPLE 3: CASH GRAIN FARMER — Grain stored on farm until sold. Picker or picker-sheller. Ear corn storage with mechanical drying, shelled corn with heat ($3000 investment). Harvest at 27.5% in early October or harvest at 20% in November. Ear corn stored without mechanical drying in corn crib. Shelled corn must be dried.

	Early Harvest		Late Harvest	
Item	Ear	Field Shelled	Ear	Field Shelled
HARVESTING				
Equipment	$ 304	$ 425	$ 304	$ 425
Power, etc.	76	85	76	85
Hauling	60	60	60	60
Power, etc.	46	46	46	46
Elevating	46	46	46	46
Power, etc.	4	4	4	4
Labor	150	150	150	150
Loss	300	400	600	700
STORAGE				
Structure	400	400	400	400
Loss	152	72	152	72
DRYING				
Equipment	108	390	0	390
Fuel & Oil	74	224	0	99
MARKETING				
Net discount	0	120 (too dry)	0	110 (too dry)
Hauling	284	177	260	161
Shelling	177	0	162	0
Total Relative Costs	$2181	$2599	$2260	$2748

EXAMPLE 4: DIRECT MARKETING (without drying or storage). Mounted picker or picker sheller. Same hauling equipment used to take corn to market as is used to bring it from the field. This involves an extra charge for fuel. Pick in November at 20% — 1½¢ straight moisture discount.

Item	Ear	Field Shelled
HARVESTING		
Equipment	$ 304	$ 425
Power & Fuel	76	85
Hauling	60	60
Power, etc.	46	46
Fuel for Hauling (extra)	10	8
Labor	150	150
Losses	600	700
MARKETING		
Net discount	279	271
Shelling	170	0
Total Relative Costs	$1695	$1745

EXAMPLE 5: DIRECT MARKETING WITH DRYING (high moisture). Mounted picker or picker-sheller. Hauling equipment brings corn only to dryer. Pick in October at 27½% moisture. Method D used for ear corn. Method C ($3000 investment) for shelled corn.

Item	Ear	Field Shelled
HARVESTING		
Equipment	$ 304	$ 425
Power, etc.	76	85
Hauling Eq.	60	60
Power, etc.	46	46
Elevating	50	50
Labor	150	150
Loss	300	400
DRYING		
Equipment	212	390
Heat, Power	111	176
MARKETING		
Net Discount	0	0
Shelling	185	0
Hauling	296	180
Total Relative Costs	$1790	$1962

Most attempts to reduce rules of thumb to scientifically precise guides result in more thumbs than guides. We hope that will not be true here. The table on the opposite page lists, so far as is possible and practical, all the costs involved in harvesting, storing and marketing corn using the various alternatives available in the present state of farm technology. The values given are for a unit of 50 acres or 4,000 bushels (assuming an average yield of 80 bushels per acre). The items marked with asterisks on the left side of the table remain constant for any acreage up to 150, since it is assumed that the same equipment would be used. But the power, fuel and repair costs will vary. For example, the fixed annual cost of the forage harvester used to make silage would be $240 (A. Harvesting Costs, item 1, first column) whether 25 or 150 acres were harvested. But the power, fuel and repair costs (item 1a, first column) would be $104 for 50 acres, half that amount for 25 acres, or three times as much for 150 acres. In figuring harvesting losses, the proper figure indicated under item 5a must be added to the figure given under 5b. For example, in harvesting ear corn at 25% moisture in October, the loss would be $400 ($200 plus $200). The question marks for some of the items under Feeding Costs (Section C) indicate it is either assumed that the same equipment is used for unloading the cribs, bins, etc., as was used for filling them, or that it is impossible to estimate the costs because of the great variety of potential methods which might be used, as in the case of horizontal silos. The figures in the grey area (Feeding Value Gain) are a credit rather than a cost. The examples (above) are built on figures taken from the table and show how these figures can be used to estimate the costs involved in almost any corn harvesting, storage, feeding and marketing situation. The facts and assumptions upon which all the figures in the table are based are set forth in that section of the text beginning in the last column on page 86.

(*Text continued from page* 82)

harvesting equipment he must have. The corn picker will harvest his corn for delivery to the crib, to bins, flat storage or sealed silo. But, if he intends to store only the shelled grain, the picker-sheller or the combine may prove more efficient. The picker-sheller is actually about the most flexible piece of harvesting equipment. It can be used simply as a picker or as the complete picker-sheller. Some growers use the latter arrangement to harvest high-moisture shelled corn to go into sealed silos early in the season; then they take off the sheller attachment and pick ear corn for the crib; and finally they use the sheller again to harvest corn to go through the dryer and into bins or flat storage.

Making silage, of course, necessitates the use of a forage chopper and blower. And it takes elevators or augers to get the corn into cribs, bins and flat storage buildings. Elevators and augers can also be used to move the grain into sealed silos, but the augers cannot handle ear corn silage.

It takes silo unloaders to get the silage out of the upright silos, though augers can be used to remove the shelled corn, either as a dry or as a high-moisture material. Dryers are a necessity if the crop, either shelled or on the ear, is to go into tight storage. A moisture content of 12 per cent is the maximum under such conditions. Corn can be safely stored in a crib at 18 per cent moisture and 15.5 per cent is the standard for number 1 corn in the cash market.

Comparative Costs

Of vital concern to any farmer considering the relative merits of these various systems is the matter of costs. Benson J. Lamp, Jr., and Kenneth A. Harkness, agricultural engineers at The Ohio State University, have put together the table of figures on page 84 (and the examples on page 85) which give the comparative costs of harvesting, drying, storing, feeding and marketing corn on a Midwest farm. The figures are given for a unit of 50 acres producing 80 bushels of corn to the acre for a total of 4000 bushels. These are relative or comparative figures rather than absolute figures. In actual practice they will vary from farm to farm but the relative difference in costs between the various methods will almost always be the same.

Any corn-grower can select the proper figures from this table and decide for himself which will be the most economical method for him to handle his crop.

On page 85 five examples are worked out in detail. The beef or dairy farmer in example 1 has five alternative methods by which he may handle his corn. On the basis of $1 corn and current production charges the relative costs range from $1,112, if the 50 acres of corn are put up as whole plant silage and fed to the cattle in that form, to $2,763, if the crop is field shelled and dried and fed in that form.

The hog farmer in example 2 has three alternatives. The cash grain farmer (example 3) who stores his grain on his own farm before marketing it has two alternatives besides a choice of harvesting time. The man who markets direct from the field without drying the grain (example 4) has two alternatives. And the man who dries his corn and then takes it to market (example 5) has two alternatives.

All the figures in these examples were taken from the appropriate place in the table on page 84. For example, the $240 charge for machine use for harvesting silage (the first figure in the first column in example 1) is the first figure in the first column in the table, Harvesting Machine Cost. The harvesting loss in ear corn harvest (sixth figure in the third column of example 1) is the sum of 200, the shelled corn loss when moisture is 25 per cent, plus 200, the ear corn loss when harvesting is in October.

Any grower can select the appropriate sets of figures to analyze his own situation.

Assumptions

The figures given in the table involve a great number of facts and assumptions; such things as the cost of the various types of equipment to be used, hours of use per year, fuel costs, labor costs, construction costs on storage buildings, labor requirements and a great number of other items. These assumptions and the computations based upon them are detailed in the following material:

A-1 Harvesting Machinery

Corn picking and shelling ..... 1¼ acres per hour
Ensilage—Whole Plant ..... 1 acre per hour

Item	Forage Harvester	2-Row Mounted Picker	Mounted Pick-Shell	S. P. Combine
Investment (Replacement Cost)	1,600	2,000	2,800	†4,300
Hours of use per year	50	40	40	40
Cost per hour	30c/$100 invest.	38c/100	38c/100	38c/100
Repair Cost	48c/hr.	40c/hr.	56c/hr.	1.08/hr.
Fuel, Oil, etc.	60c/hr.	50c/hr.	55c/hr.	70c/hr.
Tractor Cost/hour	1.00	1.00	1.00	—
*Invest.	4.80	7.60	10.64	16.34
Fuel and Power	1.60	1.50	1.55	.70
Repairs	.48	.40	.56	1.08
Total Hourly Cost	6.88	9.50	12.75	18.12
Total per 50 acres	$344	$380	$510	$724

* Insurance, Housing, Interest and Taxes
† About ½ charged to small grain

A-2 Hauling Equipment Three Wagons for Each System

	Forage Harvester	Picker-Sheller, Picker, S. P. Combine
Investment Total	3,000	1,500
Total annual use	100 hrs.	150 hrs.
Investment cost/$100	13c*	10c†
Power and fuel per hr. (1 tractor)	1.00	1.00
Total hourly costs		
Invest.	3.90	1.50
Power, Fuel, Repair	1.30	1.16
Total hourly cost	5.20	2.66
Total annual cost	$260	$106

* Based upon spreader
† Based upon wagon data

A-3 Elevating Equipment

	Silage Blower	Ear Corn Silage Chopper & Grinder	Shelled Corn Silage Blower	Other Elevators
Investment	$650	$900	$650	*$400
Hours of Use	50	40	40	40
Cost/$100	33c	39c	33c	29c
Repairs/hour	7c	22c	7c	4c
Fuel & Power	1.25	1.30	1.25	.50
Hourly costs				
Invest.	2.15	3.51	2.15	1.16
Other	1.32	1.52	1.32	.09
Total hourly costs	3.47	5.03	3.47	1.25
Total annual cost	$174	$201	$139	$50

* ½ charged to hay

A-4 Operating Crews

	Silage Whole Plant	Silage Other	Grain
Field Operator	1	1	1
Hauling and Storage	2	2	1
	3	3	2

Additional for servicing, etc., ¼ more than operating time. The assumption is made that the field harvesting limits the capacity of the operation. This generally is true.

Total hours	50x1¼x3	40x1¼x3	40x1¼x2
Man hours	188	150	100
Cost at $1.50	$282	$225	$150

A-5 Harvesting Loss

Assume 2½% loss for silage between field and silo.

		Pick	Field Shell	
Kernel loss at	30%	2½%	5%	Justified upon the basis
	25%	5%	7½%	of kernel dry matter
	20%	7½%	10%	loss. Probably is higher.

Ear loss:

September	2½%	Same for shelling
October	5%	
November	7½%	
December	15%	

(*Continued on page* 174)

NEW CROPS

WE COULD EASE our surplus problem if we could put some of our land to producing crops which we now import. If, to use an impossible example, we could use some of our land now growing corn, wheat and cotton to produce rubber and coffee, we could eliminate our surpluses and reduce our imports. As yet, botanists have not developed coffee or rubber trees adapted to our climate, but they have found a number of useful plants which we can grow on lands now producing surplus crops.

The discovery of such a useful crop is only the beginning. After the plant breeders have developed an adapted, productive variety, we must learn its fertility requirements and the technique of cultivating it, and its insect and disease enemies and their control. Industry must produce machinery for cultivating and harvesting it, and, after all that, markets must be found where it can be sold at a profit. This takes coordinated effort on the part of government research workers, farmers and industrial users of the product. The President's Commission on Increased Industrial Use of Agricultural Products has urged that we spend five million dollars a year to help in this work and to tide such new crops over the awkward period before normal marketing procedures can establish a reasonable price based upon supply and demand.

The Commission believes the establishment of such crops can play a helpful role in easing the surplus problem. They warn, however, against the optimistic idea that a few new crops thrown into our rotations will solve the surplus or any other farm problem.

Some of the new plants which have possibilities could supply raw materials from which paper and cordage are produced—we import some 32,000,000 tons of the finished product annually—others would be useful for producing gums, oils for lubricants and synthetics, waxes, pharmaceuticals, insecticides, and, of course, new foods.

Here are ten of the many new crops which show promise:

Castorbean: The oil from this plant has been used as a lubricant for man and his machines for a century. We have grown large acreages of castorbeans as a war emergency measure under heavy subsidy in the past, but it was an expensive crop to grow and harvest due mainly to a lack of harvesting machinery. We have now developed

(*Continued on page* 164)

Castorbean

Bamboo

Sesame

Ramie

Sansevieria

Kenaf

For another new crop, Safflower, turn this page.

SAFFLOWER

A new crop for surplus wheat land, safflower is building a national market. It is now grown under contract.

By Joseph Muir

IN 1957 Edwin Emigh planted part of his Sacramento Valley farm to thistles, tended them as best he knew how, worried about weeds, water supply and general prosperity. They did so well he has planted at least 75 acres of them every year since.

If cultivating thistles sounds like a mild form of insanity you should visit Emigh's place in August when he runs combines into his fields, carefully gathers the seeds and hauls them to market. They bring him a cash return in the vicinity of $130 an acre, assuming, of course, that it has been a good year for thistles.

Emigh, along with a growing number of western farmers, is producing a member of the thistle family, known as safflower, because it is a promising oil-producing crop. Twenty years ago safflower was practically unknown in areas where hundreds of acres of it are being grown today. Last year some 600 California farmers grew 100,000 acres for the vegetable oil industry. Another 1,000 widely-scattered growers in 12 western states added a second 100,000 acres to the total safflower crop.

Processed, it becomes 50 million pounds of vegetable oil, for which industry is finding a growing number of uses important enough to convince safflower boosters that this old-world plant has blossomed into a new age of prosperity.

Paint chemists favor this oil because it is colorless and, unlike some other oils, won't yellow with age. Blown, boiled and processed, it is used as a grinding oil as well as a base for calking compounds and putty.

Safflower oil is also getting a big play as a dietary supplement, in salads and cooking oils. It contains, say the chemists, more essential fatty acids per calorie than any other edible oil. All this adds up to an expanding market for a growing acreage of the plant with the oily seeds.

The livestock industry was quick to see in the safflower meal a by-product feed supplement. Now companies refining the oil move much of their meal production into western feed lots and dairy barns. It carries 18 per cent protein, 37 per cent crude fiber, six per cent ash, and sells at $35 per ton today.

Edwin Emigh makes the safflower popularity among farmers understandable when he translates it to dollars. "It costs me about the same as barley to grow, but brings in twice the money," he said last fall.

Safflower is an annual plant and even the modern commercial varieties still carry spiny evidence of its place on the thistle family tree. Plant breeders are trying to remove its rough edges at the same time that they're working to increase the oil content.

The flowers, which are composite, with green bracts, come in orange, yellow or white depending on the variety.

Its long, sturdy taproots reach as deep as six feet into the ground. Its height varies from a foot and a half to five feet. The oblong leaves grow for four or five weeks in flat rosettes at ground level then straighten up.

Safflower matures in 110 to 115 days. A bushel of the seed weighs from 37 to 48 pounds depending on variety. Over a third of this weight is hull and here again the plant breeders are busy; they want a thin-hulled variety. Oil content of the commercial varieties ranges from 26 to 37 per cent.

The safflower really began its rise in American agriculture in a typical session of the Nebraska legislature back in 1940. That was the session in which the lawmakers passed a bill to establish a new Chemurgic Department at the Agricultural Experiment Station in Lincoln. The assignment of the new department was to search far and wide for new crops that might help bolster Nebraska agriculture.

The year before this, Kansas-born Carl Claassen graduated from Kansas State with his bachelor's degree in agriculture. He had gone almost immediately to Washington State College and by 1941, when Nebraska was looking for someone to head the agronomic section of its Chemurgic Department, he had a brand new master's degree and was looking for a job. Once the Experiment Station in Lincoln hired him, Claassen continued his graduate studies at the University of Nebraska until he obtained his doctor's degree in 1948.

Meanwhile he was busy carrying out the assignment of the Experiment Station Director. "It was a peculiar assignment," Dr. Claassen said, "and a challenging one. I was told to work only on those crops not grown commercially in Nebraska." What the Nebraska people wanted to do was to bring in new sources of wealth. Dr. Claassen's assignment was simple: Find them.

The flower of the spiny plant (opposite page) is a thing of beauty; it is also the mother of the white seed from which the amber oil is extracted. The seed is combined (below) using wheat equipment.

Dr. Claassen's research led him to many crops and one of these was safflower. It is doubtful that he realized in his first brush with the thorny plant that he would eventually become the world's leading scientific worker with safflower. Around his laboratories they speak of him respectfully now as "Mr. Safflower."

Dr. Claassen picked up all the available safflower types obtainable in this country and brought them to Lincoln. "Then we began bringing others in from Africa and Europe," he said. "We

(*Continued on page* 168)

Georgia Feedlot

Deseret Farms is geared to turn out 15,000 fat steers every three months. Five men grind, mix and feed 150 tons of concentrate in an eight-hour day.

A truck is being loaded beneath one of the two feed storage bins (lower left) of the highly-automated Deseret operation. The ground and mixed feed is conveyed to the molasses mixer, immediately above the storage bins, and from there to the bins. Each bin has a capacity of 30 tons. The trucks are loaded by gravity, in a few seconds. Leo Ellsworth, general manager, and E. J. Morgan, resident manager of Deseret (left), confer during one of Ellsworth's frequent visits from a Florida feeder operation, which he also manages.

THREE MILES OFF Highway 280 south of the little town of Leslie, Georgia, the red clay road turns out of a grove of live oak and suddenly against the horizon looms an impressive collection of metal buildings, bright orange towers, pipes, chutes, and conveyors of the new cattle-feeding plant of the Deseret Farms. Everywhere are cattle—in a maze of feeding pens around the plant, and clustered around feed bunks in the fields for miles along the highway. In early 1960 there were 13,000 head; a variety of breeds, grades and weights being finished for market.

Deseret is a pasture-feedlot operation with a highly automated feed-mixing and distributing plant. Most of the 45,000 cattle which Deseret expects to run through the plant annually will come from an affiliated Florida plantation, the remainder will be bought locally. The feeder stock are started on pasture and supplement, moved to the feedlots for finish. Corn for the ration is bought from local farmers.

Deseret Farms is owned and managed by the Mormon Church. There are approximately 7,000 acres in the holding, of which 2,000 acres are under lease. The resident manager is E. J. Morgan, a deliberate, kindly man in his late thirties, formerly an Idaho dairyman and cattle raiser. The managing director of Deseret Farms and a multi-thousand acre plantation in Florida, a feeder operation for Deseret, is Leo Ellsworth. Mr. Ellsworth is a shy man, of great dignity and presence, who has, man and boy, spent his life with cattle.

The Deseret operation is highly automated. Unlike most automated plants, which start as hand work and grow little by little as the farmer gets tired or wants to enlarge, the Deseret automation started from scratch and was all on paper to the last detail before construction started. The core of the plant is a big feed-mixing mill made by the Williamson Company of Whittier, California.

Three huge ear-corn storage buildings flank the feed mill on the north, and directly opposite is a supplement and hull storage building. Supplement and the cottonseed hulls, which form a great part of the roughage in the ration, are delivered in box car bulk via a two-mile spur of the Seaboard, and in trucks from local gins. A car unloader (scoop with dragline), made by the Webster Company of Tiffin, Ohio, unloads the supplement into a pit beside the tracks, and from there it is conveyed to the supplement storage building by auger. A conveyor from each of the ear-corn storage buildings dumps the corn into two hammermills (Roberts Mill Co., Denver) and from there it is drawn by blower to a bin atop the mixer. The hammermills have a combined capacity of 20 tons an hour. After the grain, hulls, and supplement are mixed and weighed, the mixture is conveyed to an elevated molasses mixer and from thence to two storage bins. These bins have a capacity of 30 tons and are unloaded into the feed wagons by gravity.

The mixer is fully automatic, operated from a panel directly in front. Automatic pneumatic scales indicate the exact weights of grain, supplement, and molasses for each ration. The mixer has a capacity of 2,000 pounds per batch. It takes approximately three minutes to grind and mix a batch. At the present time, with approximately 13,000 cattle on feed, the mixer is operated one eight-hour shift each day. The plant is geared for several times the number of cattle now being fed if operated around the clock.

Two trucks are used to haul the feed to the cattle. Each has a capacity of four tons and can be unloaded by a self-contained auger unloader in a matter of minutes.

Two men and two trucks feed 13,000 cattle twice a day. The first feeding starts at 6:00 a.m. and is finished about 10:00 a.m.; the second starts at 1:30 p.m. and is finished at 4:00 p.m. In addition to the 48 pens near the feed plant, there are a score or more of feeding stations in the pastures, some of them at least two miles from the plant. Here the feed is unloaded into low, long, trough-like feed bunks. The driver rambles down the highway at the best speed of his truck, gets out and opens the old-fashioned barbed-wire drag gate, mounts and drives to the feed troughs. Without stopping he throws the unloader into gear as soon as he comes alongside, empties his truck and drives away for another load. During the rainy season he must buck the hazard of the sticky and sometimes bottomless Georgia clay. The feeding pens near the plant are served via a concrete driveway between two rows of pens. The feed troughs run the length of the pens, some several hundred yards.

The Deseret plant and the feeding layout were designed by Charles Willis, of Arizona, who saw the construction, started about two years ago, well under way. In addition to the two corn storage buildings at the mill, and another nearby, Deseret owns an elevator three miles away on the Seaboard. These four buildings have a capacity of 250,000 bushels. The concentrate building will comfortably store 15 thirty-ton carloads. The molasses tank under the mill holds 100 tons. The estimated investment in the entire plant, including garage and office, but excluding land, is in excess of $250,000, of which approximately $150,000 is in the mixing mill. The feedlots are roughly 150 feet square, 10 to 12 in a line on each side of a center driveway. The feed troughs run the length of each pen along the driveway. It is planned to pave all the feedlot pens during the coming year. Twenty have been completed at this time.

The initial plan called for a maximum of 15,000 head on pasture or in the finishing pens at one time with a three-time turnover during the year. The maximum of 15,000 is expected to be reached in the fall of 1960. While the feed mill, if operated in shifts, will take care of close to double this number, this is not in the immediate plan of operation.

The highly automated Deseret feedlot operates with a minimum of labor. One

man, Charlie Padgett, operates the feed mill, sitting through an eight-hour shift before the control panel. He has three helpers. One keeps the corn moving into the hammermills. Two men haul the feed.

Three or four Georgia cowboys handle the cattle, using horses on occasion. They walk bandy-legged and dress in the best tradition of the Western range. The cattle buyer and foreman of the cowhands is Luther Gardner. In all, about twenty men are on regular employment, including office and maintenance. Construction now going on adds as many more. This figures out at 2,250 head per man on an annual basis when maximum production is reached. Concrete slabs are being put down on a series of pens, and the working area around the mill is being paved. A local vet is called in as needed.

Inherited with the plantation when it was bought in 1958 were a peanut acreage allotment, now rented, and a sizable pecan operation. The pecans are retained as a small sideline to cattle, but no other crops are produced on the place.

The Feed

The basic feed for the Deseret cattle is corn, ear-corn bought from local farmers. So great is Deseret's appetite for corn (last year, feeding 13,000 head, 500,000 bushels were used) that it takes the great bulk of the local production. When Deseret starts buying the new crop in August the price immediately jumps to 5 or 10 cents above the market and continues so until the year's needs are met. This is a good deal for the farmers, but is not popular with other smaller corn users in the area. At the beginning of the season the corn is priced on a basis of 20 per cent moisture and an 80-pound-per-bushel ear corn weight. Deseret likes a maximum of husks on the corn, what the Southerners call snapped corn, for the cobs and husks are an important part of the roughage in the ration. The cottonseed hulls are bought from local gins; the molasses comes from Cuba by tanker to Jacksonville and from Jacksonville by tanker truck, and is stored in a tank below the floor of the mixing shed. The bulk of the supplement now being used is Purina's Steer Fatina. Until recently Deseret had mixed their own supplement, using cottonseed meal as basic protein. However, when meal advanced in price, they found the commercial product cheaper. Fatina includes the necessary minerals, antibiotics, and stilbestrol. The exact proportions of corn, supplement, hulls, molasses and roughage in the ration is somewhat of a trade secret. The 13,000 cattle clean up approximately 150 tons of feed per day.

Stilbestrol is an integral part of the ration. For a time they tried implanting the hormone, but finally settled on feeding it in the ration as the most satisfactory. None of the cattle from the Florida plantation get stilbestrol on the range, and Mr. Morgan doubts if any of the local cattle have had the drug before going into the feedlot. Deseret will not buy cattle, if they know it, which have had stilbestrol on the range.

The 7,000 acres of pastures at Deseret provide an important part of the feed during the pasture season of 9 or 10 months. Native grasses are being replaced by Costal Bermuda and Bahia, and pasture improvement is intensive. Little hay is made. Occasionally when pasture gets ahead of grazing, a cutting of hay is taken off, chopped, and used as roughage in the feedmix. During the good pasture season, an acre will provide all the grass for three animals. No records have been kept on the relative gain on pasture and on full feed in the lots. Since all are fed a heavy concentrate ration, the pasture serves mainly as roughage.

Water is provided by wells and a few wet weather ponds. Wells are dug at strategic positions and the water piped to tanks in the feedlots, fields and field pens.

The towers at top left of the picture distribute the components of the feed from storage to the mixer, which stands immediately below the towers and behind the molasses truck. From the mixer the feed goes via a chain conveyor, which runs diagonally to the molasses mixer immediately above the holding bins on the far right. The truck is unloading molasses into a tank beneath the mixer and control panel.

The Cattle

"We buy anything we think we can make money on," says Morgan, and the cattle in the pastures and lots bear him out. Cattle bought locally are generally higher grade than the Florida cattle. Local cattle range from the very best to ordinary, but they are predominantly English breeds and are improving as the cattle industry in Georgia zooms ahead. The Florida cattle, several cuts below the local stock in quality, range from pure Brahma to a touch of Brahma. Crosses include Hereford, Angus, Jersey, and the ancient Spanish swamp cattle. Generally the Florida Brahmas do not do as well as the local English breeds in the finishing pen.

If Deseret could get what they want they would buy only high-grade steers weighing 600 to 800 pounds to finish out at 900 to 1,000 pounds, choice and high grade. In recent months lighter stock has been bought, 400 to 500 pounds. All stock are put on pasture, when it is available, or in the pasture pens, and given supplement along with the pasture until they are ready for finishing. The concentrate ration is gradually increased until the stock goes into the finishing pens, where they are fed a 70 per cent concentrate ration for an average of four weeks. In January, there were not more than 300 heifers in the 13,000 population at Deseret.

A few tests have been made on weight gain and costs per pound of gain. Evan Lyman, accountant for the Farms, says his books show cost of pound of gain ranges from 18c to 19c, and that their very best cattle show close to a 3 pound-per-day gain in the lots. No effort has been made to feed a ration by weight—all stock are given all the feed they can consume. The amount is generally left to the "eye" of the feed wagon driver, who keeps the bottom of the feed bunks covered at all times. Three rations are fed, depending on the stage of finish. When the feeders arrive at Deseret they are turned on pasture and given a 40 per cent supplement ration. In the final feeding stage, the supplement is increased to 70 per cent.

When the cattle are brought in they are treated for parasites, vaccinated, those that need dehorning are dehorned, and all are branded with the "D" of Deseret Farms except those from Florida, which bear the Beehive Brand when they arrive. Shipping fever has been the biggest disease hazard. Strangely enough, there has been little or none in the Florida cattle—mostly in the local stuff which comes in by truck. There has been some founder, little or no bloat. The great plague are the parasites, especially liver fluke in the Florida cattle. They have found little or no remedy for this type of parasite, and must take the probable penalty when the cattle are slaughtered.

The cattle are counted occasionally, every two or three months, and no evidence has been found of rustling. "The stock that are most likely to be rustled," E. J. Morgan says, "are in the pastures. These are mostly Brahmas, and a Brahma is about as easy to rustle as a grizzly with the toothache."

The Brahmas are skittish. They have

learned that the feed wagon means them no harm, but a person on foot, a blowing newspaper, or a sudden noise will send them off in a gallop, with their tails in the air. The Brahma jitters seem to be contagious, for other cattle, herded with them, sometimes become hard to handle.

The Markets

The managers of Deseret hope that the annual output, planned to exceed 40,000 when under full production, can be sold to packers within truck range of the Farms. Some are now trucked as far as 200 miles, but the bulk go to packers in Albany, 30 miles away, Americus, 20 miles, and Moultrie, 70 miles. When prices were higher, regular shipments by rail went to Baltimore and other northern markets.

Cattle men in the area are skeptical about how profitably the local packers can deal with 40,000 cattle a year, and freely predict that Deseret will have marketing troubles, just as they are now having trouble buying in quantity, the feeders they like.

The problem of handling large masses of cattle in a feedlot operation is not new, having been tackled and conquered on the Pacific Coast and the Southwest some years ago. However, the Deseret people have a problem that has not plagued the western operators, that of mud. A pen of cattle can turn a lot into a bottomless quagmire in a few hours following a rain; trucks mire down or slither off the roads. The population in the feedlots has been reduced to control mud, but the only permanent solution, an expensive one, is concrete or asphalt paving. Deseret will put down a concrete slab on two strings of pens this year, and has just completed asphalt paving of the area around the mixer and garage.

The disposal of manure from the pens is another problem which Deseret still has to face. Its use as fertilizer, Morgan says, is questionable economically because of the cost of hauling. Bulldozers have pushed it off the pens into low spots in the area, but this type of disposal has its limits. Manure is no problem in the pastures, but since these are being reduced in size by a system of fences, some means of spreading it will have to be devised in the near future as pasture population becomes concentrated.

Disease hazards, marketing, and supply of both cattle and feed are other problems which the managers believe they can handle as they arise. Deseret has pioneered many innovations in automated cattle feeding and the Board of Directors in Salt Lake City reports full confidence in the managers to resolve any future problems.

Charlie Padgett, mixmaster, records components and weights of a ration (top) as they go into the mixer. All operations of mixing and weighing are controlled electrically from the panel. A batch of 2,000 pounds goes through every three minutes. The driveway (bottom) between two rows of feeding pens is being roofed and the pens are being paved as Deseret prepares for winter feeding. The feed truck is emptied by auger into the feed troughs on either side of the driveway.

Three-acre Dairy

A father and his two sons manage 300 cows on three acres and they don't own the three acres.

ON A SANDY, three-acre wedge of land in the Salt River Valley, near Phoenix, Arizona, W. E. Weaver keeps three hundred registered Jerseys. The slice of irrigated desert is rented from James Bond, whose land surrounds the Weaver Dairy, and the rent is manure, all the manure the three hundred cattle produce.

Six years ago, Bill Weaver, a plain-faced man with a soft-spoken voice and an ever present Stetson, left his home farm in Washington, Indiana, with 29 female registered Jerseys. He is now milking 204 cattle.

Arizona, picked to help his second son's bronchial troubles, turned out to be a new life for Weaver. "It's not easy to leave your friends, your home, some family and your church," he said, "but it all turned out for the best. We've done very well here."

After some experience in the dairy business near Phoenix, Weaver decided it was best to concentrate and specialize. Whereupon he and his previous landlord, James Bond, drew up a ten-year contract, beginning in December 1958, which gives Weaver three and three-tenths acres on Bond's farm, and gives Bond all the manure the Weaver Dairy produces. A handshake, and a clause to permit renewal were the extent of the contract, which takes priority over sale of Bond's land. "I needed land and Jim Bond needed humus," said Weaver. "He runs two crops a year and it really takes the organic matter out of the soil."

A hundred cows to the acre demanded compact planning for the parlor and corrals that Weaver and his two sons built. The only building is their "barn"—a parlor and milk house 15x46 feet. The parlor is a three-each-side tandem milk-shed with hand-operated gates and doors. The pipeline from the DeLaval milking machine leads to the 784 gallon bulk tank. The supplement is hand-fed from drums which are filled periodically from the bulk supplement bin tacked on one end of the barn.

In a half circle around the parlor are six corrals, each holding 35 or 40 milking cows. On each side, three corrals share an alley next to the parlor. On each side is a holding pen, filled from the alley, and leading into one leg of the parlor. When a cow leaves the parlor, she returns along the alley to the corral she recently left.

The cattle are held, one corral at a time in the holding area, which is 12 by 24 feet, the small size dictated by cleaning efficiency. The concrete floor of the holding area slopes up to the parlor door. "You never see a cow standing with her hind legs higher than her front when she's chewing the cud," said Weaver, "and we want all the cows in the holding pen facing the parlor door. The slope is not much, but it works. You'll see there are flat, low steps to the door, taking the cow to the milking level. The cow sets her foot flat on the steps. It's much better than a ramp, and it doesn't get slick. A cow's always waiting at the door."

Behind the semi-circle of corrals are pens for dry stock, young heifers and calves, with strips of shade—board-roofed platforms nine feet high the whole length of each corral. The shade is nine feet high. "As high above the cow as she is tall," said Weaver.

Beyond the corrals is a pit silo, 3,000 ton capacity, which Weaver part-filled in October 1959 with 1,200 tons of hegari (sorghum) silage. "Silage is our bank account," said Weaver. "It costs us about $6.50 delivered and tamped in the trench. We don't cover it. I buy silage usually twice a year—in July and again in October or November.

An aerial view of the Weaver Dairy (left) shows the milking parlor surrounded by the corrals with their strips of shade. To the rear is the dry-cow area, and then the manure pile. At the point of the triangle is the silo, recently filled. The left hand silo is used by their landlord.

Bill Weaver, in the hat, and his sons, Dave in the check shirt, and Chib, moved from Indiana in 1954. The electric wire in the foreground is a Weaver invention to control bully cows and bad table manners at the feed manger.

I always get about 1,500 tons in July, and then we figure out what we will need in the fall. It is often just a little under the spring quantity. I've already contracted for the silage for 1960—I'll be paying $4.50 in the field for it, and the hauling should be about $2.00 a ton, delivered and tamped in the pit. The silage market is pretty extensive around here. I can always buy from a farmer within five miles. Many dairymen in this valley handle their silage this way.

"Hay costs us between $36 and $42 a ton. All our hay comes from Yuma, about 180 miles from here. It is a little higher in protein than the hay in the valley and we think it is worth the price. We have no trouble getting it. There is a good supply all year round from Yuma.

"Hay we get a little more often than silage. That pile," he pointed to a stack of baled alfalfa hay beside the corrals, "should last three or four months.

"Green chop costs us $6.00 a ton in the wagon ready to feed, and we like to use it whenever we can get it. That depends on a farmer near here having a surplus, and so we end up feeding green chop about six weeks in the year."

Inches Count

The cattle are fed twice daily in a trough which circles the outside of the corrals. The silage is run into the manger from a self-unloading wagon. Alfalfa hay is spread in the manger from a pick-up truck.

The manger, designed and built by the Weavers, has an electric wire running 24 inches above the concrete wall over which the cows must reach to feed. The cow slides her head between the wire and the wall to eat. Weaver made several adjustments before he settled on the correct height for the electric wire. "Inches count with cows," he explained. "That fence makes ladies out of our cows; they don't fight at the manger and they don't throw their heads up and down, scattering the feed around. Because they get a shock if they jostle, we have less cow combat. That wire makes it possible to run heifers and cows together, and limits the power of the boss cow. There's very little pushing at the manger. You realize what a difference the hot wire makes if the current is left off. In a couple of days of a cold wire their feeding manners become as bad as ever."

The backboard, too, is an inch-by-inch dimension. The Weavers tried without a backboard on the manger, which has a three-foot apron. They finally added a wooden board to cut down waste. Twenty inches was too low, and the present 22-inch board prevents most of the throw-over, without interfering with the self-unloading wagon. The backboard is wood because there is still a small inter-family debate, one gathers, on its desirability. Weaver's eldest son, Dave, feels the waste without a backboard is made up for by the ease of cleaning the apron when it is clear, using a blade on the tractor.

The feeding operation lasts about 2½ hours, beginning at 7:30 a.m. and 4:00 p.m. Weaver believes this is far enough away from the milking times to avoid taints in the milk.

Milks Night and Day

The Weaver Dairy is almost a 24-hour a day operation—it is now about three hours short of this, but promises to fill the gap. Milking times now are 10:00 a.m. and 10:00 p.m., and the milking lasts six and a half hours, finishing at 4:30, night and day. The Weavers are seriously thinking of going to three times a day milking, which would close the gap between shifts.

The milking is done by hired labor, two imports, Carl Gearhart, from Michigan, who works days, Charles Ross, Weaver's brother-in-law from Indiana, on nights. They are paid 6 cents per cow for milking, so with 200 cows they can get about $12.00 a day. This is the same for day or night. Weaver's younger son, Chib, 19, gives them a rest one shift a week. (Chib is the family contraction of Charles.)

The herd average is now 8,500 pounds, and butterfat 4.8 per cent. The bacterial count was 3,000 at the last test. "We do definite culling all the time," said Weaver, "but it is difficult to increase your herd size, cull, *and* improve your averages all at the same time. We are almost at maximum size now, and we expect to start improving our milk average by more severe culling." The Weavers have a few Holsteins in one corral, odd patches of black and white among the predominant reds of the Jerseys and the ruddy Arizona dust. The elder son, Dave, has been comparing the Holsteins with the Jerseys. "I believe the Jerseys hold their production a little better in the heat, and have a little better conception rate," said Dave, and his father added, "The milkers can handle 40 Jerseys an hour through the parlor, but only 35 Holsteins." The older man grinned, and, as befits a nationally-known Jersey show judge, went on, slightly prejudiced toward his favorite. "Jerseys are almost our religion," he said. "The Holsteins don't walk, they waddle. They come into the parlor as easy, but they come in just a little slower."

"We keep accurate records on the cows," Dave added, "weighing the milk every day." The day Farm Quarterly visited was official testing day, and the small house trailor of R. F. Williams, their veteran (30 years in the job) tester, was parked by the parlor. Williams stays on the job 24 hours to get samples of the various herds in the valley. Arizona has the highest percentage of herds on test of any state—and the herd size averages over 100.

Dave, a slender, dark, one-time Purdue Ag student, looks after the feeding. Their

fourteen per cent protein supplement is delivered in bulk to a hopper near the parlor. For feeding it is put in bins adjacent to the milk stalls. The cows get the supplement by the scoopful, one pound for every three pounds of milk. "But," said Dave, "we feel we are overfeeding some of our low producing cows, and possibly underfeeding some of the top producers. I think we will increase the ration beyond 25 pounds of milk." Dave is the record keeper, and a strong pusher for the new office they hope to build soon. "As far as I'm concerned," he said, "that office will be as important as this barn."

Between August 1 and November 30 the Weavers establish their base; the volume of milk for which they are paid the Grade A price. Beyond this they get the Class II price. "The heat and sun in Arizona have many advantages," Dave said, "but it is hard on the cattle to make the hottest time the high producing season. It's hard on the old cows particularly, to freshen in July for peak yields in August. We'd a heck of a lot rather they freshen in the spring." The Weavers use artificial insemination exclusively—going as far afield as Central Ohio Breeders Association to find the right sire. Their conception rates have not been unduly affected by the climate.

Irrigation Drains

Chib, a strapping, spectacled blond boy is the swing man—relief milker and general help-about. He scrapes the corrals and trucks the scrapings to the manure pile weekly. The tractor has a blade and a loading shovel. An old dump truck and the pick-up complete the vehicles on the dairy.

The 1000-ton manure pile, dry and odorless from the Arizona sun, waits to put life into the sandy soil. Once the manure is piled it is no longer Weaver's responsibility, and his landlord removes it as required, usually once a year, in the winter, between his first and second crop. Bond moved 1,000 tons just after Christmas last year.

The manure from the parlor and the milk room waste goes straight to surrounding fields. Bond's fields are irrigated with eighteen-inch floor pipe which runs in front of the dairy, three feet underground. The waste flows directly into this pipe, and so onto the fields. When the outlets to the field are shut, the manure accumulates in the quarter-mile stretch of main pipe and there is ample reserve space to hold the waste until the caps are opened again and the manure can wash onto the field. The drain is large; it has never plugged.

The Dairy Costs

It is hard to estimate the value of the land the dairy uses. Any land in the Salt River Valley is worth $1,000 an acre and in small parcels could bring two or three times this price. The cost of the dairy buildings and equipment Weaver puts at $20,000 but this was due in part to the amount of home labor used. Weaver believes it would cost another $10,000 to have the work done on contract. "Because we have no need for a barn, apart from the parlor," he said, "the cost per cow here in Arizona is smaller than in any place I know. The pipeline, bulk tank, shades, and fencing cost is included in the $20,000. We did all the planning, and supervised every step," said Weaver. He plans to put shade over the holding pens, and build the office that is dear to Dave's heart early this spring.

Weaver's Grade A milk price is $4.67 a hundred, plus eight cents a point for every point above 3.8 per cent butterfat. The Weaver Dairy's last test was 4.8 per cent,

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The holding pens (right), behind the dairy, are sloped to encourage the cows to face the entrances to the milking parlor. However, the Jerseys were particularly interested in the photographer. The Holsteins were less intrigued, and faced the door as usual. Below, Chib Weaver brings down the day's ration of alfalfa hay.

one of the great men of agriculture,
Robert Bakewell, 1725-1795

ROBERT BAKEWELL, an English tenant farmer of the eighteenth century, was the greatest livestock breeder the world has ever known. On Dishley Grange, his 440-acre rented farm in Leicestershire, Bakewell began with stock whose pedigree was "the union of nobody's son with anybody's daughter." From this genetic hodgepodge he developed a line of beef cattle better than any in the world, fast-growing hogs of tested feed efficiency, horses of greater power in harness and almost twice the walking speed of the common work horse, and the first true meat-type sheep. He also developed a unique and profitable method of progeny testing.

Bakewell's fame as an animal breeder spread throughout the world. Able young men came to Dishley to work and to study his methods; King George III — Farmer George, his subjects called him—had Bakewell visit the Court to talk about farming and to show his livestock to the royal family; nobility from as far away as Russia visited Dishley to see for themselves what Bakewell had accomplished. So great was his fame as a sheep breeder that when the Duchess of Exeter met the eminent geologist, Robert Bakewell, she asked, "Are you related to the Bakewell who invented sheep?"

Bakewell's skill as a dirt farmer was almost equal to his ability with livestock. He was a farmer's farmer. Many of the visitors to Dishley ignored the livestock and spent their time learning how Bakewell increased the productivity of his land with manure and irrigation—he irrigated 200 acres of the farm—and were delighted with his ingenious labor-saving methods of moving the crops from the field to the barn and the manure from barn to field.

Bakewell, himself, was a product of the superior sire he emphasized in his livestock breeding. He was the son of an outstanding farmer and the grandson of the first Bakewell to make a success as a tenant of Dishley. All three of them were named Robert and they didn't feel it necessary to clarify the situation with Junior or Robert III. The third Robert (our Bakewell) was born to Rebecca Bakewell on May 23, 1725 when the second of the Roberts was 40 years old.

Robert Bakewell (right) is shown at Dishley in a painting now owned by the Royal Agricultural Society of England and reproduced here through their generous cooperation. Bakewell's ram, Two Pounder (above) was once leased for 1,200 guineas (roughly $6,000) for a season.

Training by a father who was known as one of the ablest farmers in the neighborhood gave young Bakewell a great start in life. He helped his father spread the flood waters of the River Soar over the low fields of Dishley in their first attempts at irrigation. He was sent by his father to visit other farms and to learn their methods. He knew from hard work with crude farm tools what labor went into making a crop and formulated a principle which was to guide him through life. Stated briefly, his principle was—a farmer should get the most out of his crops by converting them as economically as possible into the highest-priced animal products.

In 1760, when Bakewell took over the management of Dishley from his father he had already begun putting his basic principle into practice through animal breeding. With no more knowledge of genetics than that like produces like and the good should be mated to the good he started his process of selection.

He began his cattle breeding with the longhorned, red animals then grown in Leicestershire. The ideal animal at this time was a big-boned, strong beast which could pull a plow, give a little extra milk for cheesemaking, and retain enough muscle in old age to provide tough but salable meat for the growing London market. Bakewell ignored this current ideal. A growing city population—the industrial revolution was just beginning—convinced him that meat production was the major purpose of cattle raising. He determined to breed an animal which matured in the shortest possible time on the least amount of feed. If it was to be eaten, it should have as much muscle and fat as possible and as small a bone as could support it—for no man eats bones. The muscle should be distributed in those areas which produce the highest-priced cuts of meat. And nothing else was important to him.

In selecting his basic stock he used both his eyes and his hands, but he always claimed if he could use but one of his senses he would use touch—a blind man could make a better selection than a man without hands. He then used inbreeding as a tool for fixing and accentuating the desirable qualities he had chosen. One of his original selections, a cow named Comely, produced a bull calf which grew rapidly into the compact, meaty type which Bakewell admired and which the neighbors said wasn't worth twopence. He named this bull Twopenny and bred him to his mother Comely several times. A bull and a heifer from this mother-son cross produced his fine bull "D" and a cross between "D" and another daughter of Twopenny and a related cow produced "Shakespeare," a bull which was described as "the greatest stock-getter the Midland district ever knew," in spite of the fact he was as inbred as Cleopatra or the Inca of Peru.

Inbreeding was a daring thing in Bakewell's time. The superstitious were sure it brought on insanity and degeneration and the religious element felt it was highly immoral even in the production of livestock. It is probably for this reason Bakewell never openly discussed his breeding methods with the casual visitor at Dishley.

Bakewell kept records of growth and thriftiness to select the fast-maturing stock which put on much flesh with little feed. He also looked for conformation. As he said, "You want to get the beast to weigh

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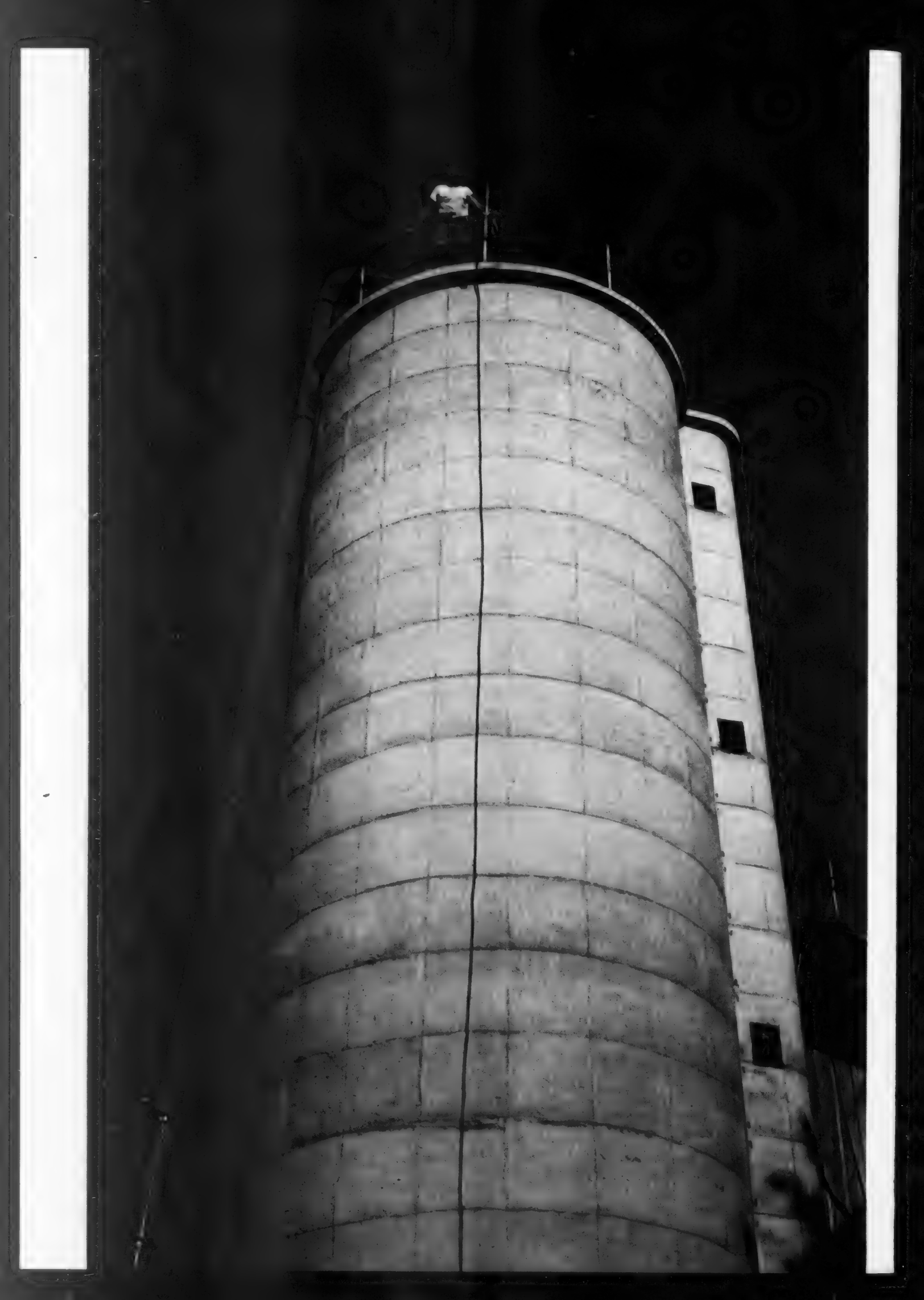


Two or More Silos

Dr. Charles F. Rogers is an expert on silage. He is a broad-shouldered man, though not large, and his hair is greying above a bluntly chiseled face. His hands are hard working hands. He did not learn about silage and silos only from books. He has built silos and filled them for many years. He has written several articles for Farm Quarterly. In this article he was questioned by the editors about the system he calls the "multiple use of silos."

Question. Dr. Rogers, you have often said farmers make too little use of silos. What do you mean by this?

Answer. I mean that a farmer should use his silos to the utmost. He should fill and empty them as many times a year as possible and he should use several silos to get the best possible timing in the use of his crops.

Q. Why do you think a farmer should have several silos? Wouldn't one big one be better?

A. Let me illustrate this. Recently a farmer asked me if he should own a 30x60 silo, and my answer was, "I don't know, until I learn what your operation is like." He said he had 400 acres and intended to put 130 acres in corn, 130 in oats, and 130 in meadow crops, such as alfalfa. I asked him if he thought he could get all of the silage from 130 acres of corn into the silo. He said he thought he could. I asked him the same question about the 130 acres of oats and again he thought it would go into the silo. The answer was the same for the 130 acres of meadow crops. I then asked him how he thought he could get the corn and the oats and the meadow silage into the silo and have access to all three. Then his answer was, "I don't know."

I tried to pass on to another question, but this farmer persisted. He told me I wasn't answering his question, so I replied, "You could fill a 30x60 silo with each one of 3 crops from 130 acres, and you ask me if you should have one 30x60 silo. My answer emphatically is no. You should have three 30x60 silos *if you are good enough to manage them and the crops and the feeding.*

Q. Then, Dr. Rogers, you do not quarrel with large silos?

A. I have no quarrel with the size of large silos, but with the idea that any single silo is likely to be adequate. To have adequate silage capacity you need two or more silos of the right size. I believe you should have silos of the right size. I believe you should have silos of varying sizes, so that you have flexibility. Multiple use of silos is a two-fold idea involving more than one silo, and continuous use of their contents. The silages are there for use, not simply storage.

Q. What capacity for silage does a farm need?

A. I believe a farmer should have container space equal to about 1½ years' need. With this silage conveniently available in several containers, a farmer can "ride over" a year of poor crop yields without disturbing his feeding plans for his normal livestock numbers .When a good crop year comes he can accumulate feed. When he finds he can buy livestock well, or prices look good, then this accumulated feed is available without capital outlay. In addition, I believe a farmer should have a separate reserve, which I call a "dead" reserve, which is put up in years of great plenty into an inexpensive container to hold for occasional times of near famine. A horizontal silo on the ground with sides made of earth and covered with earth, may be best. This "dead" reserve is held until a time of real distress or maximum opportunity.

Q. How long would the "dead" reserve keep?

A. Well, I know it will keep 20 years if you take reasonable precautions to pack and protect the pile. This system of silos, then, would give you a chance to keep your livestock feeding operation at a constant size, and you will not be as subject to the cost or supply of feed. You can stick to your steady plans, and this consistently is far more profitable than trying to out-guess the market or feed supply.

Q. When you have 150 per cent of a year's need, you will always have some material to be held over to the next year. Why couldn't you do this in one large container?

A. If you think you can manage in a single container — you must be a good enough planner and operator to be able to decide what successive crops you will plant and harvest and in what order you will put them in one silo so you can feed them in the same order, or in the reverse order depending on whether you get silage from the top or bottom of the silo. And the crops can't go into the silo until they are ready. You will feed one at a time, and yet they should always be the best combination of forages for the stock you are then feeding. I challenge anyone with any cropping system to do all this from one silo. If a farmer is feeding milking cows, dry stock and young stock out of one container, how can he get the proper combination of silage so he can give the right quality of roughage to all three? How can he supply the maximum percentage of their nutrients from one silage, and still make the best use of his concentrates? I believe it would require a large measure of magic. It is for this reason that I suggest there be two or more units, adding up to 150 per cent of the capacity a farm needs in silage each year.

Q. Surely a farmer could fill one large silo completely with corn silage, know exactly what he was feeding, and supplement it as necessary?

A. With corn silage this may be relatively easy to do, because corn makes consistently good silage, if all the corn is harvested into the silo at the same stage of growth. But it takes time to fill a large tower silo. For one of the newest 30x60 silos it may take 8 to 10 days, 24 hours a day. Some farmers may be set up so a corn crop can be ensiled that way under approximately ideal conditions; and with one silo, one crop and one feeding system I have no quarrel, merely

(*Continued on page* 158)

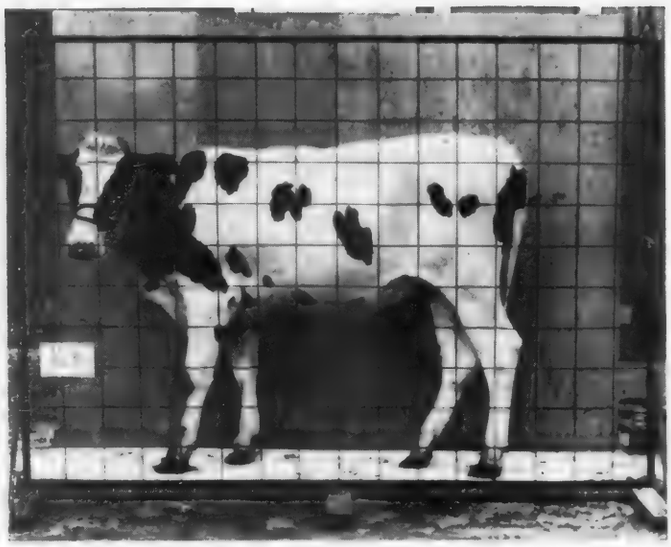
This single silo (opposite page) restricts the farmer because he can only unload one kind of silage at a time, although he can fill it with a succession of different crops. Thus, with one silo, no blending of silage is possible.

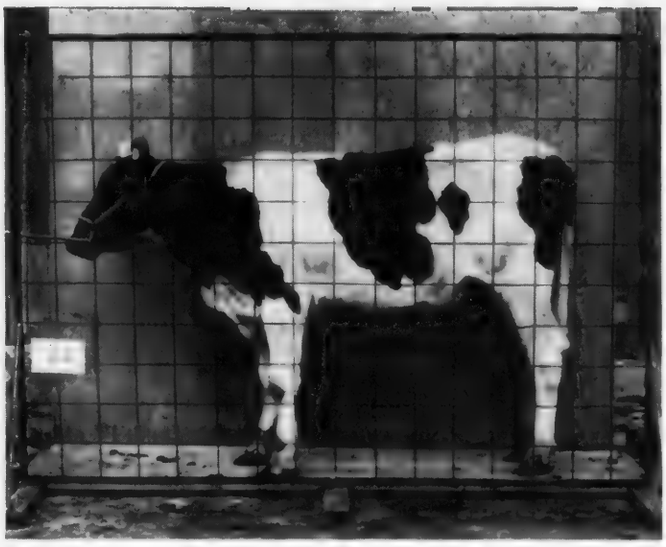
Two or More Silos

Dr. Rogers is a proponent of the system he calls "multiple use of silos." This concept demands two or more silos, to be filled and emptied as often as possible during a long forage season. Dr. Rogers advocates the use of grass and meadow crops such as alfalfa to extend the season of silo filling. This spreads the depreciation cost of the silo and the machinery used for filling over many days' use.

Using two or more silos, the forage ration fed to livestock is blended to keep nutrient levels relatively constant, and different ensiled crops allow a long harvesting season.

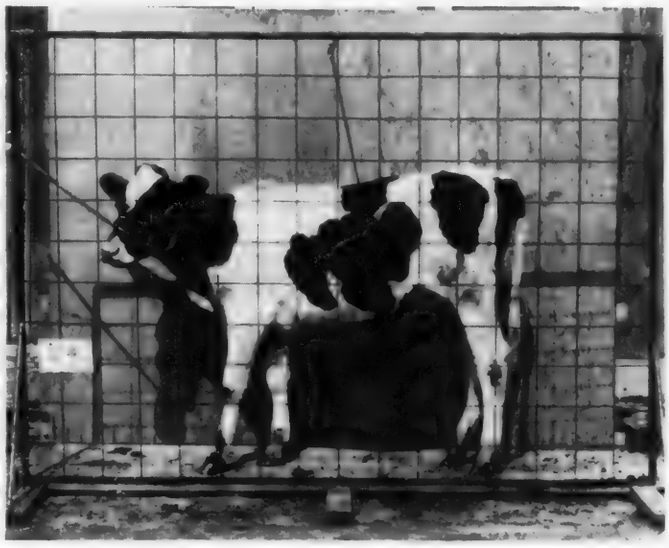
Under the system, the silo capacity for the farm should be 150 per cent of one year's need to allow for occasional bad years. Dr. Rogers also recommends a "dead reserve" of silage stored in a trench silo in a year of great plenty. This can be used in times of great need or maximum opportunity.





FEED
makes the cow

Limited feeding in early life does surprising things for milk production and to the length of the cow's productive life.



SCIENCE IS PRESENTING dairymen with two alternatives to the present recommended method of raising heifers. They can raise them for early maturity or for a long lifetime productivity. Feeding between birth and first calving is the means to the desired end.

Fed at as high a nutritional level as can be stuffed into them, heifers grow rapidly and mature early—enough earlier to gain from a half to a full lactation over their poorly-fed sisters. When put on a diet and fed lower than normal levels, heifers grow more slowly and sexual maturity is delayed. But the early production records of these smaller animals are as high as those of their fat sisters; later production is higher; during their lifetime they consume less feed for the amount of milk produced; and they seem to live longer and have a longer productive life.

Scandinavian scientists as well as Americans have been studying the effects on cows of rates of feeding between their birth and first calving. No one in recent years has carried the low-feeding experiment into the producing period of the cow's life. "There is no need to experiment here—we know the answer," Dr. J. T. Reid, of Cornell University, said recently. "The answer is always the same. When a cow is producing milk, the lower the nutritional level, the lower the milk production. Too many dairymen are proving this in practice today. The early feeding experiments, however, have produced some rather surprising results. They may cause us to re-examine what the standard of recommended feed for the young heifer should be. The Scandinavians have already done just this; though it is worth noting that their standards were somewhat higher than ours to start with."

The lifetime experiment which Dr. Reid, Dr. J. K. Loosli and others have been working with at Cornell is probably the most thorough of any performed on this problem. Since 1948, Holstein heifers have been added to the project at three days of age and grouped into trios of approximately the same age. Using as a base the standard of total digestible nutrients published by Morrison in *Feeds and Feeding,* one heifer is fed 60 per cent of a standard ration, one is fed 100 per cent, and the third is fed 140 per cent. By 1953, 102 heifers had been put on the lifetime experiment in 34 trios and a number of others had been a part of the experiment and had been slaughtered for study. Another part of the experiment conducted by Dr. R. W. Bratton and Dr. W. Hansel studied the growth and reproduction ability of bull calves.

Keeping calves on their diets was not easy. Some of the bull calves, for example, couldn't stow away enough feed to make the 140 per cent grade; though most heifers were able to do this. Normal, good pastures were found to be too high in total digestible nutrients for the heifers restricted to 60 per cent of the recommended ration.

To begin with, low-ration heifers were fed milk for five weeks (total 189 pounds of milk); the middle group got milk for seven weeks (total 368 pounds); and the high-ration animals were given milk for 24 weeks (total 2,008 pounds). From birth to first calving, the low-fed group ate 968 pounds of concentrates, 6,145 pounds of the poorest hay, and had 324 days on the worst pastures available. The middle calves were fed 1,930 pounds of concentrates, 7,378 pounds of good hay, and had 232 days on improved pasture. The high group were fed 5,357 pounds of concentrates fortified

Three experimental heifers at 18 months show the results of different feeding levels, high (top, left), medium (top, right) and low (bottom). The high and low-fed heifers are twins.

with minerals, 6,847 pounds of the best hay, and spent 223 days on improved pasture. Because the low-fed heifers picked over their pasture and ate only the leaves and tender stems, leaving the coarse stems, Dr. Reid figures their actual feed was closer to 65 per cent of the recommended total digestible nutrients (TDN).

If They're Big Enough They're Old Enough

The rate of growth varied directly with the level of the feed. The high-level group made a daily gain of from 1.6 to 1.8 pounds, the medium from 1.2 to 1.5, and the low from .6 to .9. The trios which were slaughtered along the way showed the fastest-growing heifers developed earlier and larger glands and organs of reproduction.

During the early years of the experiment, the aim was to breed at 18 months (the recommended period for Holsteins) if that were possible. They now breed them at their second heat period regardless of age. The age at which they reach puberty, as marked by their first heat period, is one of the striking things about this experiment. The fastest-maturing of the high-fed group could have calved twice and be well on her way to becoming a grandmother (assuming her daughter was fed on the same ration) before the slowest of the low-fed group dropped her first calf. In actual time, the figures show the high-level group showed first heat at an average of 9 months and 9 days (a month and six days over and under this figure saw the whole group through first heat); the middle group averaged 11 months and 6 days (plus or minus a month and 12 days); and the low-level group averaged 20 months and 15 days (plus or minus 4 months and 6 days).

The size of the animals when they reached first heat was far more uniform than the age. They varied but an inch or two on height, length and heart girth (the low-fed group was the tallest, the medium the longest and of greatest girth). Weight at first heat varied from 531 pounds for the low-fed heifers to 596 for the medium—the high-level heifers averaged a pound less than the medium. It appears that size is a far more important factor than age in reaching sexual maturity.

Little difference was found in the number of breedings it took to settle the heifers in the different groups. They all averaged around one and a half. Calving was a different matter; the low-level heifers seemed to have a more difficult time than either of the other groups.

The different levels of feeding continued right up to calving, producing a marked difference in weight at this time. After calving, heifers averaged 1,208 pounds for the high, 1,062 for the medium, and 845 for the low. Calf weights averaged 90 pounds for the high-level group, 85 for the medium, and 80 for the low.

Feed For Milk Production

After the first calf was dropped, the feeding program was radically changed. All animals were put on full feed based on the standards set up for body weight and milk production. During the first year on full feed the low-level group ate 118 per cent of the recommended TDN, the medium 109 per cent, and the high group ate 100 per cent. Because of differences in body weight, however, the high group ate the greatest amount of feed (by a small amount). After second calving, all animals received 100 per cent of the recommended ration. Because of greater body size, the high group continued to consume more feed than either of the others.

One thing shown by this experiment was the ability of the cow to continue growing. Between first and second calving, the low group gained almost 50 per cent of its original weight—from 845 to 1,235 pounds. By the third calf, the average weight of the low group and the middle group were practically the same. After the third calf, the high group held a 100-pound weight advantage over the two other groups. In dairymen's terms, it would take about 4 cents more feed per day or $15 a year to maintain the high group after the third calf—before then, the difference would be a little greater.

When measured at the milk pail, the animals gave a surprising twist to this study. The first lactation records show practically no difference between the three groups. During the second and third lactations the low and medium groups pulled ahead of the high, and after that the low passed the other two in milk production. The following table shows the records accumulated to date. The difference in numbers of cows is due to the fact that calves were added to the project at different times.

Milk and Fat Yields

Feed Level	No. of Cows	Days in Milk	Milk Yield (lbs.)	Fat Yield (lbs.)	Fat (%)
First Lactation Period					
LOW	31	332	8,840	329	3.72
MEDIUM	34	314	9,083	343	3.78
HIGH	33	319	9,226	354	3.84
Second Lactation Period					
LOW	29	295	10,299	383	3.72
MEDIUM	33	301	10,509	401	3.81
HIGH	32	289	9,752	372	3.81
Third Lactation Period					
LOW	27	288	11,077	404	3.65
MEDIUM	31	286	11,208	425	3.79
HIGH	30	274	10,671	402	3.76
Fourth Lactation Period					
LOW	23	311	11,514	406	3.52
MEDIUM	28	296	10,863	410	3.77
HIGH	25	272	10,667	395	3.71

Slightly less than half of the animals have gone through the fifth and sixth lactations and their records definitely accentuate the trend showing the low group pulling away from the others. The Cornell scientists, however, feel that too few animals have yet gone through these lactations to make the trend stand up. It could easily be flattened out or even reversed by the remaining animals going through this period, they point out.

But how does one explain the definite falling off of the well-fed animals in later life?

For an explanation we turn to a somewhat similar experiment at the University of Tennessee conducted by Dr. Eric W. Swanson. Using several sets of identical twins, Jerseys, Dr. Swanson put one of them on normal feed and another on extra heavy feed. The normally-fed heifers outproduced the fat animals in six out of seven cases. Toward the end of their second lactation some of the animals were slaughtered. The udders of the fat twins showed that fat deposits had remained in the udders of the fattened twins and that their secretory tissue had not developed as well as that in the normal twins. It seems quite possible that these fatty areas have permanently prevented the development of some of the secreting cells which produce the milk.

Culling

"When we culled animals from the experimental herd," Dr. Reid, of Cornell, said, "we were far more lenient than any farmer would have been. This was particularly true in culling for sterility. These animals were bred three times, and if they failed to conceive, were

(*Continued on page* 156)

FEED
makes the cow

Experiments show that early feeding affects later production and longevity. Fed at 140 per cent of the recommended feeding rate, heifers grew and matured sexually much more rapidly than those raised on standard or substandard rations. They gained a full lactation on the poorly-fed group which were fed 60 per cent of the standard ration. In later life, however, the poorly-fed group surpassed the other two in milk production. It also appears they will live a longer productive life. The correlation between greater longevity and limited early feeding have been shown for other classes of living things.

Four-wheel Drive Tractors

Power on all wheels has meant new steering, new traction, new power, higher speed—and greater cost.

By John MacCallum

THE HORSE HAD THE FIRST four-wheel drive system, and it is still the best. The horse could adjust his ground contact at all four points, to give the best grip possible; he could steer at front and rear; and he could move sideways to turn practically in his own length. When the horse started to work a load he threw his weight to his hind legs. Last, but not least, he could bend in the middle.

There have been numerous attempts to emulate the horse. But for about 10 years the Wagner Tractor Co. of Portland, Oregon, has produced a series of four-wheel drive rubber tired tractors, which bend in the middle like a horse, and are up to 200 times as powerful as a horse. Recently one of the very biggest manufacturers of tractors, John Deere, introduced its model 8010, a four-wheel drive diesel tractor which also develops some 220 horsepower at the engine. International Harvester plans to introduce a tractor with four-wheel steering and four-wheel drive perhaps in the 280-290 hp. engine range within the next six months.

The Wagner and Deere tractors form one group of the four-wheel drive field. They have an articulating, or non-rigid frame. This articulation is not new. There were hinges mentioned in the patents of old steam tractors as long ago as 1880. But articulation is certainly an advancement, and if this is not the first we have heard of it, it is certainly not the last. The other group of four-wheel drive tractors have a rigid frame, and in this group there are roughly three classes depending on how the tractor is steered.

The first class has fixed axles which cannot be turned. The wheels always point straight ahead. The tractor is steered by using some method of changing the speed of the wheels on one side. This may be accomplished with brakes—skid steering—or by speeding up the wheels on one side. The latter has the advantage that the tractor is under full power on turns and is able to pull its full load around turns. With skid steering the pull is reduced by 25 to 40 per cent on turns. The fixed axle is not as common in agriculture as it is in earthmoving equipment.

The second class of steering is the conventional method used on a two-wheel drive tractor. The front wheels are pointed in the direction of the turn. They may use brakes on one of the rear wheels, to make very tight turns.

The third group uses steering on all four wheels. There are two ways in which this steering can be used. In the first, the front wheels are pointed in one direction, the rear wheels in the other and a tight turning circle results. The wheels follow each other, and the front and rear wheels on either side take the same track. The second way is "crab" steering when all four wheels point in the same direction and the tractor moves sideways as well as forward. Here we have shades of the horse again.

Why Four-wheel Drive?

Four-wheel drives have recently aroused interest because for years changing practices have been demanding more power and draw bar pull. Farmers have wanted higher speeds, bigger implements and easier controls such as hydraulic assistance. Many farmers have used crawlers to meet these requirements, and even two-wheel drive tractors have been creeping up in horsepower until now several are available with close to 100 engine horsepower.

Farmers are overwhelmingly agreed on the convenience of the rubber-tired wheel type tractor. In the small and medium power range it almost dominates the field. But engineers believe that at 100 hp. the two-wheel drive farm tractor with rubber tires has about reached the peak of power that it can efficiently and economically transmit under normal conditions.

One logical step then is to equip the two-wheel drive tractor with a front wheel drive axle. Conversion kits costing roughly $1200 are now available for many models, and some models are available from the factory with a four-wheel drive conversion as factory equipment. Some independent companies make a conversion for various tractors. The Elenco Co. of Aurora, Illinois, for example, makes them for the 600 and 800 Series of Ford Tractor. Also certain foreign tractors are available with four-wheel drive, such as the Fordson Major imported by Ford, and the

Porsche imported by American Porsche-Diesel, Easton, Pa.

There are, however, two fundamental disadvantages to the addition of front wheel drive to a conventional rear wheel drive tractor. The first disadvantage is that the front wheels are smaller than the rear wheels, and on a turn the front wheels do not describe the same circle, nor cover the same distance as the rear wheels. On a corner, the rear wheels make a circle of smaller diameter than the front wheels, and so revolve more slowly. But the drive to the front wheels is geared to make all four wheels cover the same amount of ground when they run in a straight line. Thus, when the tractor turns a corner, there must be some slippage of either front or rear wheels. In other words, the tires must scuff a little unless there is a clutch, a ratchet, or an inter-axle differential. These are some of the means of disengaging the front wheel drive on corners and may be manual or automatic. Most of the conversions do not contain such a device, and this difference in speed of the two sets of wheels can put a considerable strain on the four-wheel drive mechanism. This calls for heavy construction if breakages are not to occur. This may not be serious on soft soil where all-wheel drive is most used. It may be very serious on roads, but two-wheel drive may be good enough on roads where the wheels don't slip. A means of disengaging the front wheel drive would be advisable if a four-wheel drive tractor were to be used much on highways.

Weight Transfer

The second disadvantage to the tractor converted from two to four-wheel drive is the lack of weight on the front wheels. When a two-wheel drive tractor is stationary, the weight is roughly two-thirds on the rear wheels. When the tractor is under load this weight distribution changes and even more of the tractor's weight is transferred to the rear wheels.

Weight transfer occurs when power is applied to the rear, or driving, axle and the front of the tractor then tends to rear up, (as careless operators have found to their regret). Due to this weight transfer, when the tractor is pulling an implement there is usually more weight on the rear wheels. When plowing, soil is actually lifted and the reaction of lifting is transferred to the tractor, and largely to the rear wheels.

This weight transfer has been carefully studied, and designers of two-wheel drive tractors have planned that as much weight as possible shall be on the rear driving wheels. The front wheels carry only enough weight to make it possible to steer the tractor. Under certain conditions, the weight on the front wheels can be so little as to make steering difficult. In these cases, separate brakes on the rear wheels can help steering.

The aim in four-wheel drive is to have an equal weight distribution under operating conditions on all the wheels. When front drive is added to a tractor designed for rear drive, the front of the machine is still lighter than the rear, even under load, unless weights are added in addition to the wheel weights and the liquid in the tires. These weights cost money—and it takes power to move them. They may also affect the steering. Power-assisted steering may be necessary. But if they are a compromise in design, this is not to say the conversions are not useful. For certain work, such as operating in bad conditions with front mounted equipment such as a dozer blade, scoop, fork or shovel, the conversion is extremely valuable and many operators swear by it.

Original Designs

Those tractors which were designed from the drawing board to operate under four-wheel drive have first to overcome these two disadvantages. Four tires of equal size can "track": i.e., rear wheel on either side must follow the path of the front wheel. Tracking is a simple means to be sure front and rear wheels travel the same distance on turns to avoid scuffing. In the John Deere and the Wagner models, this has been achieved very simply by placing a large hinge exactly in the center of the tractor. The two halves of the tractor turn relative to each other. International Harvester proposes to solve the problem in another way. The operator can select either conventional steering, turning only with the front wheels; track steering, where the rear wheels turn in the opposite direction to the front wheels but follow in the same track; or, thirdly, crab steering in which the wheels all turn the same amount in the same direction and the tractor moves sideways as well as forward. These axles are hydraulically turned. In the track and crab steering, rear and front wheels cover the same distance when the wheels are turned. In conventional steering they do not.

In all these models, the problem of weight transfer is solved by having 60 to 65 percent of the weight of the tractor on the front wheels when the tractor is stationary. This design means that under average working conditions the weight load will be approximately equally distributed between the two axles. (If the weight is spread equally at full load it will be different at half load so it is arranged to be equal under the most common work load.)

Skid Steering

On certain large rubber tired tractors, designed mainly for earth moving, but which in some degree invade the agricultural field,

The Wagner TR 9, 135-horsepower tractor has articulated steering as clearly shown in this succession of photographs. This model is owned by Lee Overmeyer Farms, Francesville, Indiana. Here Danny Overmeyer drives it on their 2,300-acre farm. The dual tires are optional and unusual.

skid steering is used. Here a rigid frame tractor has wheels fixed always to drive straight. It is steered by slowing down the wheel on the inner side of the turn. This is usually accomplished by applying a brake to the inner wheels, or slipping a clutch on the power supply to the inner wheels. It is a common means of steering a crawler tractor. The result is that on a turn the tractor is not pulling under full power as some of the engine horsepower has been prevented from reaching one set of wheels or tracks.

To overcome the disadvantage of reduced power on turns, LeTourneau-Westinghouse on one model uses a system whereby power is actually "added into" a planetary transmission system near the wheels. This makes the outer wheels turn faster, giving the desired turn without reduction in power. But there must always be a certain amount of scuffing of the tires in any method of steering with fixed wheels, with a corresponding loss of tractive effort.

Frame Flexibility

For a four-wheel drive tractor to be properly efficient, all four wheels must be kept on the ground all the time. (This may not be true for a skid-steer tractor.) If on rough terrain one wheel loses good contact, the tractor momentarily becomes a two-wheel drive vehicle. (Unless certain differentials can be locked out.) Wagner and John Deere solved this problem very nicely by making the hinge which steers the tractor a revolving joint, so the front and rear sections of the tractor can twist relative to each other. Under everything except the most extreme conditions the twisting keeps all four wheels on the ground. With a rigid frame vehicle this can be accomplished by oscillating one of the axles independent of the chassis. The vertical movement of the wheels with spring compensation is more limited than with a twisting action. With the twisting joint, the two halves of the tractor meet only at one point and the power must be transmitted to the rear wheels through that point if the engine is at the front. Transmission through the articulation point is accomplished by the use of two universal joints.

Four-wheel Drive Versus the Rest

What are the basic advantages of the four-wheel drive?

1. There is less dead weight on the tractor. All the weight of the tractor presses down on driving wheels and none is lost in keeping wheels on the ground merely for the purpose of steering. There is some little dead weight as weight distribution cannot be so good as to have the right weight on each wheel at all times.

2. The tractor is safer. It is less easily turned over backwards than a two-wheel drive model. (It would be almost impossible to turn over a four-wheel drive model which had an inter-axle differential to let the wheels spin when they left the ground. As yet, this inter-axle differential is not available.) Most models will have brakes on all four wheels, and braking should be good. The question has been raised if a tractor with too much weight on the front might nosedive on a sudden stop. This is quite possible especially on down hill work, and care must be taken.

3. Using 150 to 300 horsepower engines, considerably more power will be available in a wheeled tractor than has heretofore been possible in agriculture. This will mean that one man can do more work in a day and still have the convenience of wheel traction. Particularly this affects road travel—the wheel tractor can travel on the pavement.

4. The larger rubber tired tractors are in some measure more comfortable for the operator than track layers because they are quieter and because they will produce considerably less dust in dry conditions. However, air conditioned cabs, now available for both types, may make the difference less.

5. They can have a reasonably high road speed—18 m.p.h. for the Deere, 22 m.p.h. for the Wagner. This means less time lost between jobs, and quicker turnaround in hauling and other operations. This is important for non-agricultural uses. If it offers the temptation to run home to lunch with a 200 hp. tractor it could be an expensive advantage.

6. The four-wheel drive tractor can do field work at a higher speed than the track layer. The usual operating speed for field work with a track layer is around 3¼ miles an hour. The four-wheel drive models are designed to plow and disk at 5 to 6 miles an hour. These tractors will pull smaller widths of plows or disks faster than the track layer. The smaller implement should cost slightly less, although this cost is offset by the extra wear at higher speeds, and because it takes considerably more than double the power to double the speed of a tillage implement. (To increase plowing from three to four miles an hour takes 50 per cent more power for the 33 per cent increase in speed. However, the plow does more work on the soil so the soil may need less tillage.)

The front-wheel drive conversion unit, made by Elenco for the Ford tractor (below, left) is a low-cost compromise in design, which works well for some jobs. The John Deere 8010 diesel, (above) due out in April, is a new design capable of carrying huge mounted implements on its three point hitch. This plow weighs two tons.

Disadvantages

1. The cost of this big power unit will be extremely high compared to conventional tractors. The Wagner line has three models in the agricultural range—the TR 6 at 130 engine hp., costing about $15,000; the TR 9 at 160 engine hp., $18,000; and the TR 14A at 220 engine hp., $24,000. The John Deere with 218 hp., at the engine may cost about $24,000. (A tractor of this type often costs about $100 per engine horsepower, or $1 per pound of weight. The John Deere price is not yet announced and the figure above is the author's estimate.)

This is a lot of money to have tied up in one machine, even if it does replace two or three smaller conventional tractors.

2. These big expensive models are going to be a load on established dealer organizations. Not every dealer is financially able to carry such a large tractor. In the early months of production when few are in operation, service and parts will probably be difficult to come by; though, of course, all the organizations will do their utmost to see owners are satisfied and have good service.

3. Specification sheets may show high speeds for four-wheel drive rubber tired tractors in several gears, but operating conditions may prevent the use of this speed. Merely because there is a gear which will drive the tractor 10 miles per hour is no reason to believe that a man can plow at this speed. Tools must be designed to make full use of these speeds.

4. A four-wheel drive tractor delivers considerably less maximum pull at the drawbar with the same size engine than a track layer. A 20,000 pound track layer has available almost 90 per cent of its weight at the drawbar, or about 17,600 pounds of pull. A 20,000-pound four-wheel drive tractor can develop only about 14,000 pounds of pull. (Tandem tractor tests have shown better results and under certain conditions the pull from a four-wheel drive tractor may be much more than this. But all comparisons depend on speed and ballast. These figures are for field tests.)

5. In heavy, muddy going, the wheel tractor is affected much more than the track laying machines. One study made by a government agency on the highway program showed that of the total working time available for wheel tractors, 54% was lost through rain, cold and wet weather, whereas the track layers lost only 25% of the available working time. This was with earthmoving equipment.

6. The practicality of these large machines for non-crop work has not been proved. If they will not do satisfactory row-crop tillage they are of more limited application, and a farmer should consider this when replacing two or three smaller tractors with one large one.

LeTourneau-Westinghouse has a fixed-wheel, four-wheel drive industrial tractor with some farm uses, the DW model, here used on sugar cane plantations. The International Harvester four-wheel drive tractor, probably to be brought out this year, will have both crab steering (left diagram) or track steering (right).

Compaction

This is a subject which should not be considered as an advantage or a disadvantage, because it is of such complexity that even qualified engineers cannot agree as to its effect. No one has yet shown the exact economic results of compression of the soil by tractor tire or tracks.

However, the four-wheel drive tractor, because it more often has an equal load on all four wheels has less pressure per square inch of ground contact than an equal weight and equal horsepower two-wheel drive tractor under load. Also, a stationary crawler would have about ⅓ of the unit ground pressure of the wheel tractor. Under load, however, the track layer also suffers weight transfer, and rears slightly at the front end, throwing more of its weight to the rear, increasing the pressure there.

Furthermore, a tractor with track steering increases compaction as two wheels (one front, one rear) cover the same ground.

Compaction is a fascinating subject, guaranteed to start arguments. One recent finding is that a pyramid shape of soil is affected underneath a heavy wheel. The pyramid is widest at the bottom; i.e., the deeper in the soil the pressure reaches, the wider its effect, and it goes down wider and deeper than the width of the wheel, with pressure less for each lower layer.

Farm Applications

The John Deere four-wheel drive tractor has a three-point hitch, carrying mounted plows, disks, and other tools which weigh up to 5,000 pounds. This is convenient for between-job travel, but probably the major use of large tractors will be with trailed

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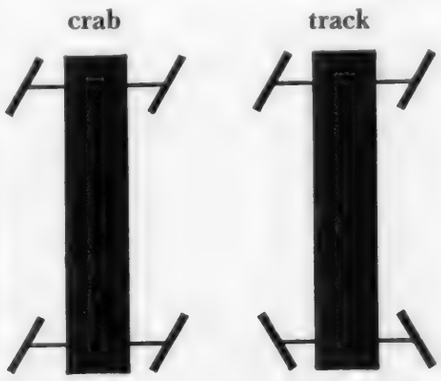


THE FAMILY CEMETERY

By R. J. McGinnis

OUR FAMILY CEMETERY was on a knoll in the south pasture, under a grove of oaks. The first of our family buried there was Eli Riddell, who bled to death from an ax wound in 1790. Eli and two brothers came out to The Valley in Illinois after the Revolutionary War to take up veteran land grants. Illinois was a howling wilderness then, and when a man died he was buried on the spot. There was no lumber handy, so Eli's brother Simon made him a coffin out of his bedstead, which he had brought west from Connecticut. They dug a grave under a spreading oak on the knoll. Simon read the burial service. The next day he hewed out an oak slab, burned Eli's name and his birth and death dates on it with a red hot poker, and set it up over the grave. Eli's widow kept the grave neat and planted a lilac bush nearby.

Ten years later the first church was built at Logan, three miles away, and a portion of the churchyard was set aside as a burying ground. But the Riddells continued to bury their dead by the spreading oak. The ties between the living and the dead were close; a wife wanted to rest near her dead husband, a child among those who had loved it.

It was the custom of members of the Riddell clan to meet the day before Easter to tidy up the cemetery–cut the grass, clean up a year's growth of briars and weeds, mend the fence, and straighten up the leaning gravestones. The women planted peonies and laurel, which in time covered the knoll and invaded the adjacent field. In 1808 a half-dozen evergreens were purchased from a tree salesman from the East and planted on the knoll.

Everybody agreed that it was a peaceful spot for a last resting place. The oak threw its shade over the little cluster of graves, and the evergreens swayed in the breeze that always swept up the valley. Young men who came courting the Riddell maidens found it a romantic spot on a moonlight night; hunters could always flush a covey of quail from its protective cover, and the first wildflowers appeared there. Small boys became men the night they could walk through the cemetery without whistling.

Some said that the cemetery held the Riddell clan together. The family grew and took up homes in the valley and the cemetery could be seen from every dooryard. The corn and the wheat were planted and harvested and the day's work done within the very shadow of the old oak. Day after day, the Riddell boys, plowing in the field, passed the graves of their ancestors. A great pride of family, its substance and enduring qualities, was engendered.

But time brought its inevitable change. As the family married and new names appeared in the valley, the churchyard cemetery at Logan got more and more of the Riddell burials. By mid-century it fell into neglect, for it was difficult to get volunteers to take care of it. The rail fence rotted and went back to earth, cattle wandered over the sacred soil, saplings and briars grew among the graves. The ever-spreading roots of the old oak and the attrition of time toppled the gravestones.

For more than a generation the cemetery was not used. Then came Lafe Riddell. Lafe was the blackest of a long line of black sheep spawned by the Riddell family. He had gone west after the Civil War, worked in the cow camps and the gambling halls, was a law man for a time, and never too particular how he made a living. He had china blue eyes, red hair, and a voice like an angel. He was known far and wide as "The Bluebell" because he was always singing or whistling "The Bluebells of Scotland." A friend who came back with him on one of his infrequent visits home said that to hear Lafe sing "Bluebells" by a camp fire at night on the prairie would tear the heart right out of your body.

Lafe was a curious combination of harshness and sentiment, hardness and softness, and it was not difficult for the family to understand the strange request he made just before he returned west after his last visit home. He gathered the family about him and bound them to a solemn oath that when he "cashed in his chips" his body would be brought back and laid to rest among his ancestors in the family cemetery. He indulged himself in one of his frequent flights of sentiment. "Bury me," he said, "among my forefathers that my ashes may enrich the earth that nurtured me."

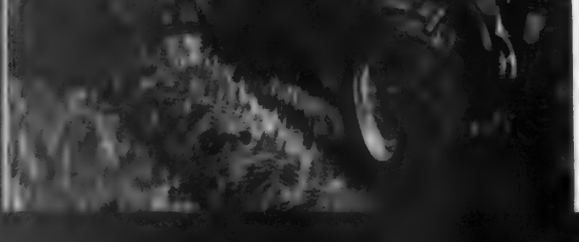
Two years later Lafe's old mother received a telegram from a sheriff in Wyoming informing her of Lafe's death and requesting disposition of the body. So Lafe came back, in a wooden box; and the men cleared a spot in the family cemetery, and buried him there. A gravestone of the period, a limestone slab engraved with a weeping willow and a burial urn, was put up. Lafe's mother composed the epitaph, "Sacred to the memory of the pious, amiable and talented Lafayette Riddell." Lafe was amiable, there was no doubt about that, and talented in certain obtuse ways; but only a mother could detect the piety.

Because the stone was new and bright, and Lafe's grave heaved so fresh among the weeds and briars, the family felt obligated to keep it green. The graves and the gravestones of the other Riddells who rest there have eroded into common anonymity, but Lafe's stands proudly, among the dark tangle, perpetuating his legend and his memory. It is said that at certain times, when the evening breeze plays gently down the valley, the strains of "The Bluebells of Scotland" can be heard, faintly and far away.

You'll be tons ahead before others even get started, with the famous MF No. 3 Baler. It's the only family-farm size baler with factory-sealed self-lubricated bearings to spare you time-wasting daily greasing. The MF No. 3 turns out uniform, perfectly tied bales at a 10-tons-an-hour clip!

Fully mounted in just one minute . . . and one man can do it with the MF 31 Mower! And from then on the going's easy, even in heavy stands. Dyna-Balance Drive eliminates noisy, wear-causing vibration. Exclusive Variable Speed Belt Pulley regulates knife speed *without* extra pulleys or belts!

Rakes more gently to save more lea because the offset reel design of the MF Rake moves the hay only half the distance fr swath to windrow. Fully mounted and hydr lically controlled for easy handling. Now y can get the MF 25 with lower priced 4 an bar reels as well as with exclusive 6 bar reel



Look, compare . . . you'll be a Massey-Ferguson man!

NEW WINDROW-GULPING "RAIN BEATER"

The new Massey-Ferguson 10 Baler gives you even more capacity, with no time-wasting daily greasing!

When the wind comes up and the first drops fall, what a relief it is to know the hay's in *ahead* of the rain!

More than any other baler, the new Massey-Ferguson 10 helps make *you* master of the weather . . . not just by chance, but by design. And it delivers uniform, perfectly tied bales, bale after bale . . . each one just the weight you prefer, and just the size.

It gets you into the field faster, when the hay is right and you are ready, with no time-wasting delay for daily greasing. And you *stay* on the go till the hay's all baled. The MF 10 Baler is self-lubricated, with factory-sealed bearings.

Out in the fields, you have stepped-up baling capacity to get the job finished while the weather stays fair. The oversized 56-inch-wide pickup and extra packer forks handle big, heavy windrows with ease. Every bale is tied to *stay* tied by the dependable automatic twine knotter.

And the bales turned out by the MF 10 are sized and packed exactly to your preference. A quick, easy adjustment sets the bale size at *any* length, from 12 to 50 inches. Another simple adjustment gives you bales of any "heft" you want . . . from 40 to 65 pounds, or any weight in between. And the bales are profit-making bales. The exclusive Leaf-Guard Design of the MF 10 handles the hay gently to save more of the protein-packed leaves that pack profit-making extra pounds on livestock.

Isn't *this* the baler you've been looking for? Better see the MF 10 Baler before haying time comes around again.

Mow, crush, windrow—all at once! The MF 60 flail-type Forage Harvester does dozens of jobs around the farm. As a hay conditioner, it processes hay for a more uniform quality with more food value . . . this modern method speeds baling because up to three rounds can be deposited in one windrow.

Now it's

MASSEY-FERGUSON

Massey-Ferguson Inc., Racine, Wisconsin

Pace-Setter of Modern Farming . . . World's Most Famous Combines and the Only Tractors with the Ferguson System

Sell an Extra Ton of Pork This Year

HOW? You can do it by marketing just one extra pig from *every other litter* of a 10-sow herd . . . (two litters per sow per year).

Today's average producer can do that much—*and more*—just by applying the proven principles of Life Cycle Management.

How do you get an extra pig to send to market?

One way is to farrow one more per litter with the help of a Life Cycle feeding and management program for the breeding herd. This can help the average producer eliminate up to 80% of the causes of variations in litter sizes, according to one college study.

Another way is to wean an extra pig per litter with the help of a good Life Cycle pig program and a modern starter feed. This combination can dramatically reduce the number of runts and give all pigs a flying start to jumbo weaning weights.

And still another way is to cut mortality with a disease-fighting feed containing Terramycin®.

While any of these improvements can give you an extra ton of pork to sell this year, improvements through Life Cycle Management don't have to be big—or dramatic—to be profitable.

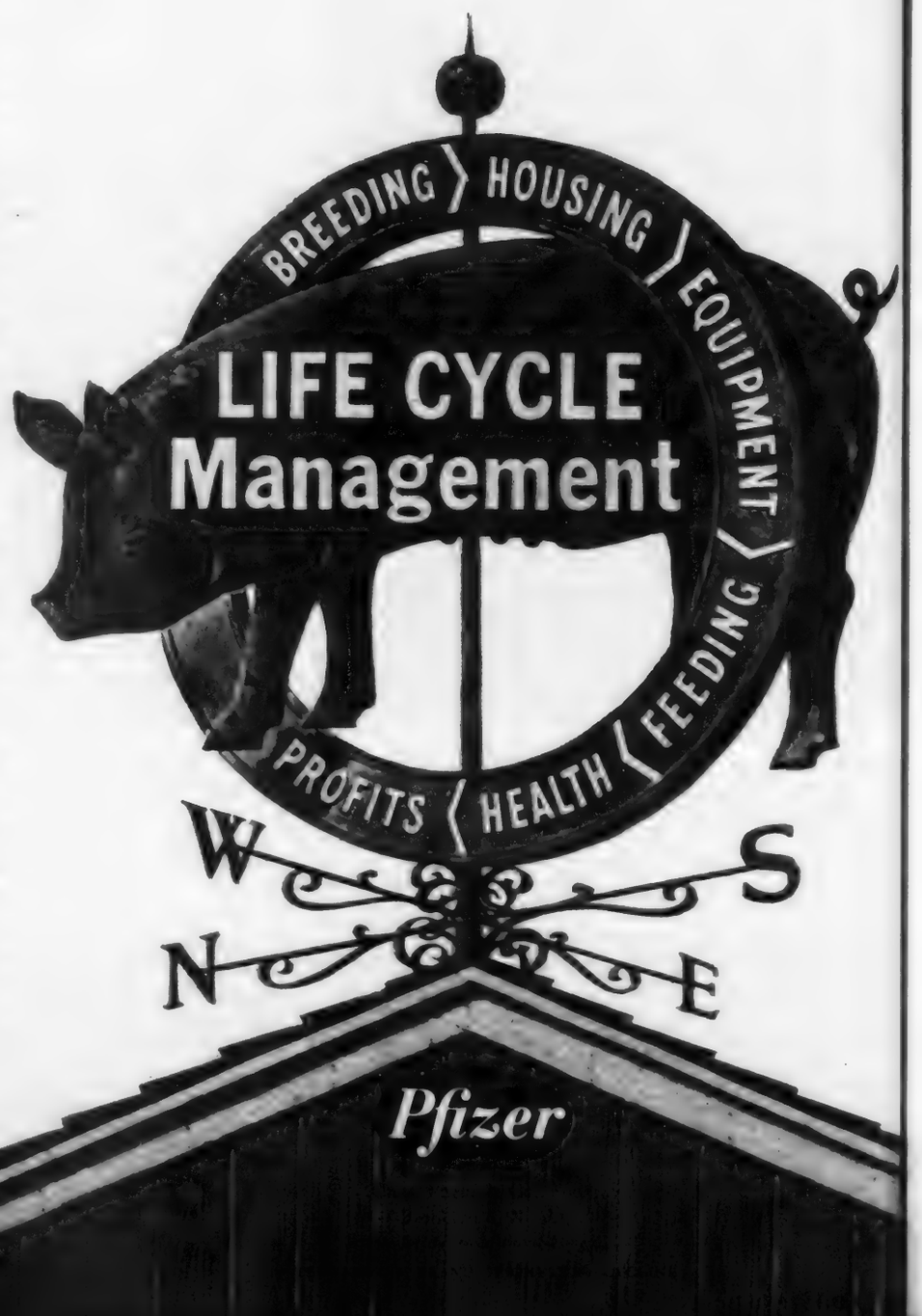
If you are a typical hog producer who, for example, might market 7 pigs per litter . . . or get 1.2 lbs. daily gain per head . . . and uses 420 lbs. of feed per 100 lbs. of gain—here's what every 1% improvement through Life Cycle Management can do for you:

It can give you an extra 280 lbs. of pork to sell, per year from every 10 sows, thanks to larger litter sizes . . . or give you 252 more lbs. of gain in the same feeding time . . . or help you save ½ ton of feed per year from every 10 sows, with 2 litters per sow per year.

Regardless what your goals are for 1960—whether you're shooting for an extra ton . . . or only an extra 1% or 2%—it will pay you to see the feed man displaying the Life Cycle Management sign.

Have him show you how his programs are designed to help you increase hog profits through Life Cycle Management.

And while you're there, have him explain how his feeds with Terramycin can help you: • increase gains • improve feed efficiency • reduce feeding time to market weight • decrease early pig mortality • and, with high-level feeds, prevent or treat: *scours* • *respiratory diseases* • *secondary infections* • help maintain weight gains in the presence of *Atrophic Rhinitis* • and help reduce abortion rate or birth of dead or weak pigs from *Leptospirosis.*



COW-Q-LATE Every Calf as Extra Dollars to Your Milk Check

FREE!
$1.98 value
Unbreakable
Polyethylene Plastic
ALL-PURPOSE PAIL

For a limited time only. You get this easy-to-clean, unbreakable 11 qt. Plastic Pail FREE with every 4 bags of Milk Replacer you buy.

Send More Milk to Market with

Red Rose MILK REPLACER

Red Rose Milk Replacer does more than just put your "milk-making-machines" into profitable production quickly. Red Rose Milk Replacer is an ideal "Early Nutrition" feed for calves. Red Rose Milk Replacer contains added minerals, extra vitamins including A and D and antibiotic feed supplements and all essential nutrients to provide fast growth and development.

One 25 lb. bag will raise a calf to weaning . . . and you will add extra dollars to your milk check because you can send ALL your milk to market.

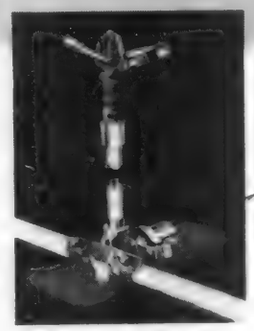
The Red Rose COW-Q-LATED Dairy Program has been developed to produce higher dairy profits . . . from calf to cow. Ask your Red Rose dealer about the complete COW-Q-LATED Dairy Feed Program. Then prove it to yourself . . . with a six month test on your own herd.

RED ROSE
GUARANTEED FEEDS
JOHN W. Eshelman & SONS
ESTABLISHED 1842
LANCASTER, PA. • YORK, PA. • CIRCLEVILLE, OHIO
TAMPA, FLA. • SANFORD, N.C. • CHAMBLEE, GA.

Distributors from Maine to Florida . . . Ohio to the Atlantic

ATTENTION FARMERS!

SHUR-RANE Sequa-Matic Irrigation



Sequa-Matic Unit

"SEQUA-MATIC" VALVE with Simple 3-Stage Operation

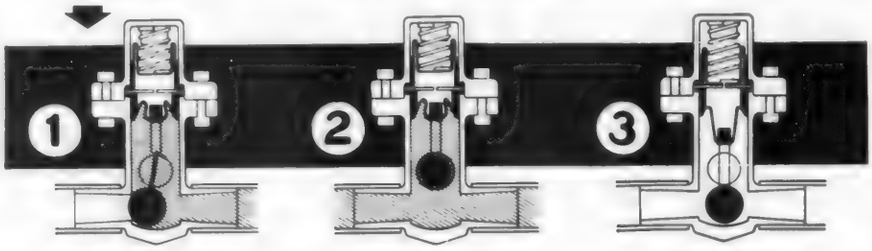
AUTOMATICALLY...

Reduces Labor Costs by providing irrigation for an *entire season with just one pipe setting.*

Increases Profits by *utilizing all water to the maximum* with virtually no labor cost.

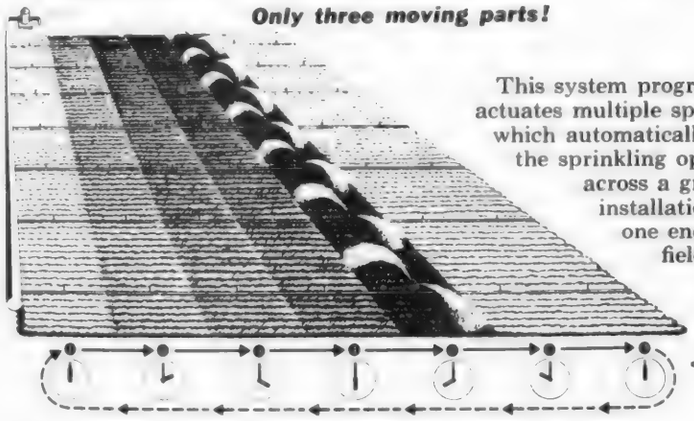
Increases Yields by providing the *right amount* of water at the *right time.*

Improves Crop Quality by *optimum moisture control* from planting time to crop harvest.



1. *Sprinkling* Position 2. *By-Passing* Position 3. *Re-Set* Position

Only three moving parts!



This system progressively actuates multiple sprinklers which automatically move the sprinkling operation across a grid-type installation from one end of the field to the other.

. . . OR MORE

A typical 40-acre system may use up to 52 laterals.

John BEAN

DIVISION OF FOOD MACHINERY AND CHEMICAL CORPORATION

Dept. FQ-1

fmc

LANSING, MICHIGAN • ORLANDO, FLORIDA • SAN JOSE, CALIFORNIA

Gentlemen:
Please send me complete information on:

☐ Sequa-Matic Irrigation
☐ SHUR-RANE Sprinkler Irrigation System

Name_____

Address_____

City_____ State_____

☐ Farmer ☐ Student ☐ Dealer

MISSOURI MEERSCHAUM

(*Continued from page* 67)

suitable cob. A suitable cob has been established by historical trial and error and is not too different from the cobs which John Scharnke brought in his pocket to Henry Tibbe 85 years ago. It comes from white corn, of the old Collier White strain. A hybrid developed by the University of Missouri known as Missouri Pipe No. 4 is also used. Cobs are mostly white but a red one is occasionally found. The cob is larger, tougher, and otherwise more desirable for pipes than the ordinary cob. The corn is grown by farmers in Missouri and Illinois under contract from the Missouri Meerschaum Co. The seed is furnished by the company, the cost of which is deducted when the cobs are paid for. White corn, either the old standard Collier or the new hybrid, is a prolific producer, yielding favorably with the best yellow hybrids. The white corn used for pipes yields between 90 and 100 bushels per acre in the Washington area. The Ottos buy only the cobs, which average out at about one cent per cob. This brings the farmer from $37 to $40 per acre for the cobs and he has the grain home free. White corn often brings a premium for hominy, cereal and chemurgic uses. The yield from 2,000 to 2,500 acres go to cob pipes on contract.

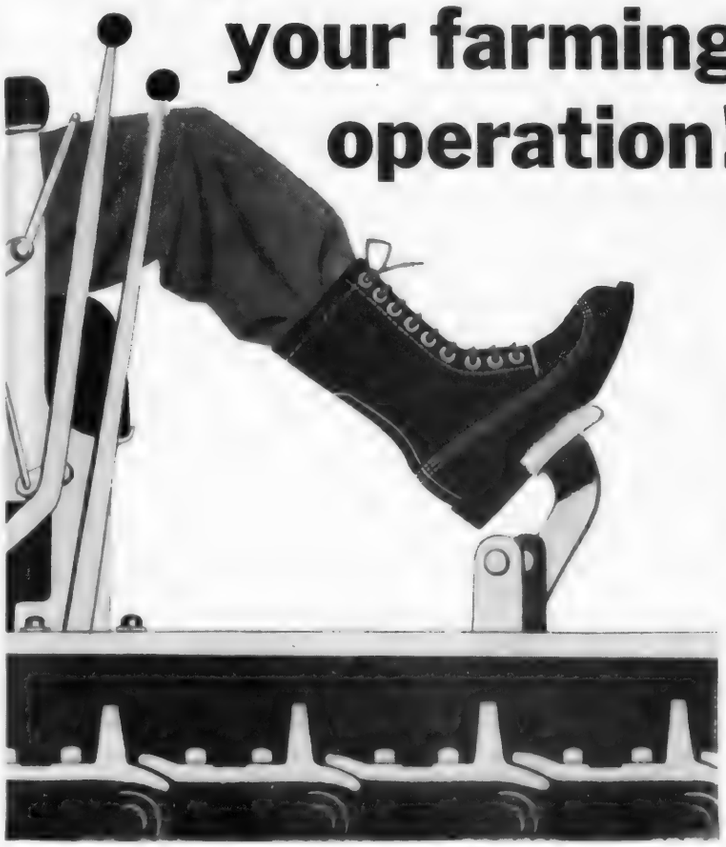
The Ottos send a special sheller with a man to the contract farmer when he informs them his corn is right for shelling. The cobs are hauled to the factory and stored for curing. Only old, well-cured cobs are used, for the older a cob gets the tougher it gets. The cavernous basement of the Missouri Meerschaum Company is chuck full of cobs from one to three years old.

In the factory the shucks are cleaned from the cob, which is sawed into pipe lengths and sorted. Each usable cob will make from one to three pipes. The larger cobs are reserved for the big $1 and $2.50 de luxe pipes. The pipe-length pieces are shaped on an automatic lathe, the center pith bored out, and a hole made for the stem.

Plaster of paris is rubbed into the pipe by hand, allowed to dry, and then sanded. The much desired brownish tint is made by a simple but ingenious trick of holding a piece of cottonwood against the rapidly-turned bowl until it is scorched by friction. The bowl is then shellacked, dried, sanded, and covered with pipe lacquer. A thin smear of pipe clay seals the pith on the bottom of the bowl. The stem is inserted, a Missouri Meerschaum label pasted to the bottom of the bowl, and the pipe is ready for the smoker.

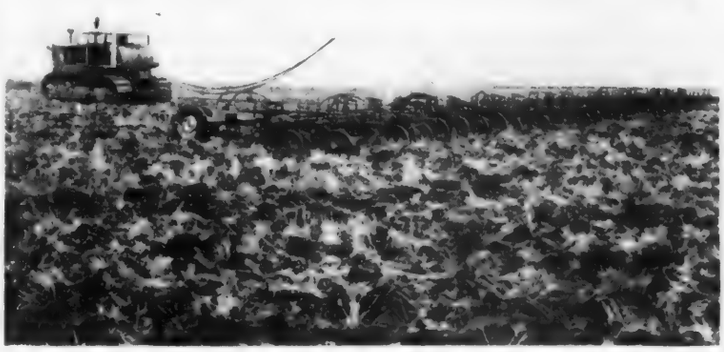
The stems are made of bone, cob, wood, vulcanite, plastic or cane, in several combinations. The wood for the stems is made of birch or maple in New England, turned roughly to shape, and shipped to the Ottos. A clever printing machine prints them with a pseudo-corncob pattern. The more expensive models are turned on a lathe, sanded, buffed with pipe wax, and assem-

7-league boots for your farming operation!



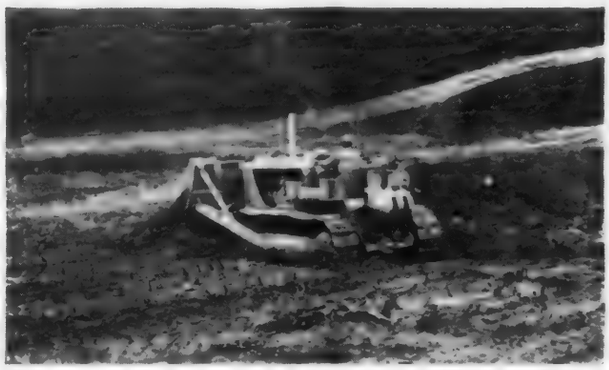
You are *truly* a giant with 7-league boots at the controls of a Cat farm Tractor! There is almost *no* limit to how much you can multiply your muscle power. Now you can break the barriers of time, labor and productivity imposed on you by wheels. Tracks and diesel power bring you farming on a business-like basis. But remember: there's a big difference in track-type tractors . . . a difference measured in lowest of all *final* costs. Get started on the right track: with a Cat track-type Tractor!

CATERPILLAR TRACTOR CO., General Offices, Peoria, Ill., U.S.A.



A Cat farm Tractor can solve a lot of time and labor problems. This D9 pulls 96′ of duckfoot cultivator working 300 acres per day . . . equal to the capacity of 5-10 ordinary rigs.

Pull 6, 10 or 20 bottoms to match your farm or labor needs—and there's a Cat farm Tractor to do it! Here, a 50 DBHP Cat D4 Tractor pulls 8-14s in Red River muckland.



Put your land in shape for 4-6-8 row equipment. With a Cat Diesel Tractor you can eliminate point rows, form fields, build terraces, combine small fields into big ones.

Work where wheels fear to tread! 1⅛ cu. yd. Traxcavator works any and every day through this sea of sloppy mud. It puts material handling jobs on an "assembly line" basis.

Add extra acres of crop land, improve carrying capacity of range land. Here, a 50 DBHP Cat D4 Tractor clears brush—a good spare-time job to make the most of manpower.

Presented in the interest of more efficient use of time, labor and money on the farm.

CATERPILLAR

Caterpillar, Cat and Tractomotive are Registered Trademarks of Caterpillar Tractor Co.

An irrigation system is no better than its weakest joint

That's why McDowell all-STEEL couplings and fittings are best.

THEY ARE:
- JIFFY JOINTS *(2 seconds)*
- 1-MAN JOINTS *(no tools required)*
- LEAK-PROOF JOINTS *(water pressure seals them)*
- FLEXIBLE
- THE STRONGEST POINTS IN YOUR IRRIGATION LINES
- ZINCILATED FOR LONG-TERM PROTECTION
- SALVAGEABLE FROM OLD TO NEW PIPES.
- THEY PROTECT BOTH ENDS OF ALUMINUM PIPE.

SEE ORANGE NOSE FOR EASY IDENTIFICATION

Need help in planning? Write for name of distributor in your area. His engineer can aid you.

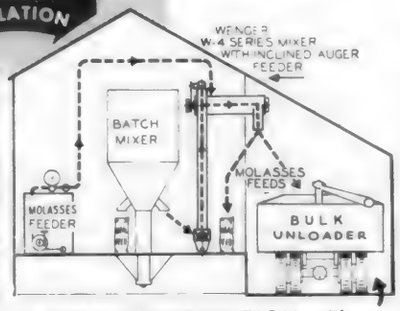
McDowell
MANUFACTURING COMPANY
Pittsburgh 9, Pa.

Dealers wanted: write us for details.

MOLASSES MEAL FEEDS IN BULK

WITH Wenger's W-4-70 SERIES Molasses Feed Mixer

Molasses mixer is positioned directly over driveway to deliver bulk molasses feeds directly to truck or to bags. See diagram. 2 models — capacities 4-8 tons and 10-12 tons per hour.



PERFECT MOLASSES MIXING *Plus* GREAT SAVINGS IN LABOR and HANDLING

No other equipment or system gives such great uniformity in mixng and efficiency in handling. Perfect for the small feed mill or feed lot. Auger lengths — 5 ft. to 20 ft. with degree of incline from horizontal to 70 degrees. Molasses percentage up to 25%.

A GREAT COMBINATION with a Wenger BULK UNLOADER built into your truck beds. See our ad on page 155 in your Winter issue of Farm Quarterly.

For complete details ask for our W-4-70 Catalog and Bulk Truck Unloader Booklet

Wenger Mixer Manufacturing
SABETHA, KANSAS • PHONE 111

bled by hand. Each worker does but one operation; one plump matron sits all day long and boils stems for bending.

The Ottos make 50 models, ranging from a cute job designed for the souvenir market, short smokers and the ladies, to a king-size type holding a handful of tobacco. An old standby is a straight stemmed pipe with a bone bit which hasn't changed much since old Henry Tibbe made the first one 80 years ago. The best seller is a 39-cent filtered stem pipe which comes in four shapes.

Another favorite is Fancy Grandpa, which has a bowl six inches deep and a double curved stem 22 inches long. The Nature Sweetest line comes in 6 shapes and sells for 49 cents. A bakelite-covered pipe, made to look like a briar, sells for 59 cents, and is regarded as a sour note around the factory. The handmade $1 Custom Grade and the $1.60 Wangee began as a concession to the snob trade, but found as much acceptance around the cracker barrel as on Park Avenue and production usually runs behind orders.

The factory is an undistinguished barn-like structure of red brick which has been added to from time to time in the last 80 years. The offices face across the street to the Hirschl-Bendheim factory, and to a small souvenir pipemaker on the opposite corner, the only other corncob pipe factories in the country and the Missouri Meerschaum's only competitors.

From time to time over the years other corncob pipemakers have tried the field, but since the Missouri Meerschaum Company owns most of the patents, they have found the going rough. The Missouri Meerschaum Company has bought out a series of competitors, among them the National Pipe Co. of Union, Missouri; the Union Pipe Co. of Owensville, Missouri; and the Phoenix-American Pipe Co. of Boonville, Missouri.

Work goes on at the Missouri Meerschaum Company factory at a leisurely tempo and on an intimate personal basis. Everybody knows everybody else and is known by the Otto brothers, who ask about the children, visit the sick, and remember birthdays. Inherited with the factory when it was purchased in 1912 was an old-timer, Christian Hesse, who continued to make pipes for 66 years until his death a few years ago.

The Ottos point with pride to the famous men—and women—who smoke and have smoked corncob pipes. Rachel Jackson, old Andrew's wife, smoked a home-made corncob, and General Douglas MacArthur held a corncob in his teeth when he "returned." H. L. Mencken, Fiorello LaGuardia, General John Pershing, and Marshal Foch were cob pipe smokers. Arthur Godfrey, Ernie Ford, Walter Pidgeon, Bennett Cerf, artists Thomas Hart Benton and Waldo Peirce, cartoonist Dr. Seuss, Defense Research Director Herbert York, and socialite Serge Obolensky are well-known modern cob enthusiasts.

The confirmed cob pipe smoker will defend the cob with his life and honor. He will tell you "it is less fragile than clay, less expensive than briar, cool in the hand and on the tongue, and light in the pocket. Its porous bowl absorbs the heat and moisture, and the cob imparts a subtle, pleasant flavor to the smoke. It needs no breaking in, as does a briar pipe."

Some smokers complain that the life of the corncob pipe is short. One customer returned an old cob to the Ottos with a sharp letter. "Your pipes," he wrote, "are faulty. I have smoked this pipe only seven years and you can see the shape it's in. Please replace it with one that will hold out."

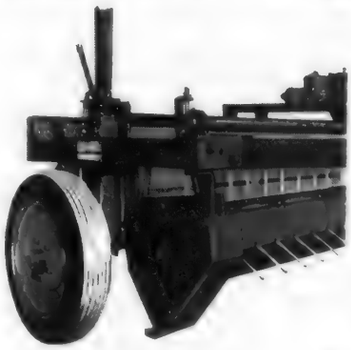
The pipe was repaired with a piece of tin nailed to the bowl, the stem was chewed short, and held to the bowl by a wire brad. Carl Otto, not one to bicker, sent the disgruntled customer a full set of the company's Nature Sweetest. This admirable business policy, and the inherent virtues of the product, seem to insure a bright future for the Missouri Meerschaum, the pride of Washington, Missouri.

The Missouri Meerschaum Company is a big industry in Washington, a tranquil little river town of some 6,000 souls. Washington is not distinguished alone for its cob pipes. There was made the first zither in America in 1866. The spread in spiritual and artistic values of the corncob pipe and the lovely zither indicates the cosmopolitan character of the town, and the artistic gifts of its people

MEYER Saves the Leaves

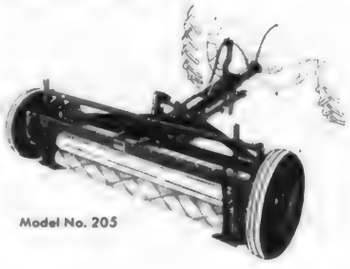
MEYER Hay Conditioner Model No. 675

Leaves Stay on Stems when SLOW ROLLED



CONDITION WHILE YOU CUT ▶

Meyer is 1st choice because you can use your own trailer-type or side-mounted mower — or you can get the model with built-in mower — an exclusive Meyer patented feature. Windrowing attachment is available.



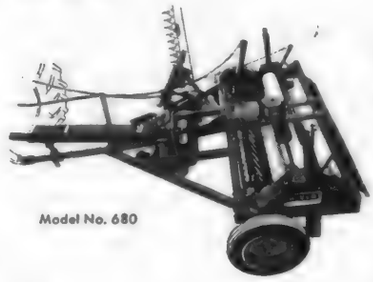
Model No. 205

NEW EXCLUSIVE MEYER PICK-UP

Exclusive large-diameter rotary pick-up floats freely over rocks and terraces . . . lifts and feeds heavy or thin hay . . . on smooth or uneven, rocky ground.

NEW EXCLUSIVE SLOW-MOVING ROLLS

Exclusive non-clogging steel rolls crack entire stems uniformly . . . revolve slowly enough to keep leaves on stems. (Slow rolling slows only the rate the hay is fed through the rolls . . . not your ground speed.) Both conditioning rolls are roller-chain driven.



Model No. 680

◀

FOR IDEAL FIELD CONDITIONS

MODEL 205 is built without separate pick-up for use on smooth fields without rocks or terraces. Exclusive non-crimping rubber pick-up roll is combined with smooth steel processing roll.

Leaves left in your field are dollars out of your pocket! *MEYER saves the leaves.* The secret: SLOW ROLLING.

MEYER Conditioning Rolls revolve slower . . . much slower . . . because they are fed by an exclusive, separate pick-up — and do NOT rely on high speed in order to pick up the hay. When high speed rolls are used, hay is grabbed up and forced through . . . leaves are torn off . . . dry too quickly . . . shatter or crumble . . . fewer get into the bale . . . or your livestock.

With the MEYER, the hay is lifted, loosened, and fluffed . . . *made ready* for its trip through the rolls. The slower-moving rolls gently and thoroughly crack the stems their entire length without crimping — gently press the leaves. *Protein packed leaves stay on.* The leaves a MEYER saves put more dollars into your pocket, yet MEYER is priced lower.

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Town_____ State_____

Dr. Wallis answers your questions about...

vitamin D nutrition

q: Is there a new recommendation for the amount of vitamin D to be fed for preventing milk fever?

a: Yes, on the basis of recent work, the Ohio Agricultural Experiment Station now recommends 20,000,000 units of vitamin D_2 per day for five to seven days before freshening. This is two-thirds of the previous recommendation. Now milk fever prevention costs even less than before.

q: Can I depend upon good sun-cured hay to supply enough vitamin D for my livestock?

a: Definitely not. Contrary to what is often assumed, the amount of sunshine received in curing does not provide a reliable basis for judging vitamin D content. Some sun-cured hay is even lower in vitamin D than artificially dried hay.

q: I have a herd of good producing dairy cows. How much vitamin D do they need?

a: Experimental evidence on vitamin D requirements is limited to work for less than a year on five or six cows in moderate to low milk production. Obviously, this is not enough to give reliable information for high-level performance on a long time basis. Based on accumulating evidence on vitamin D needs, more feed manufacturers are increasing fortification of complete dairy rations to 6,000 - 8,000 units of vitamin D per pound. As an example, when fed at the rate of 10 pounds per day, a cow would get 60,000 - 80,000 units of vitamin D daily.

q: My brood sows are getting a lot of sun-cured alfalfa hay. Will that take care of their vitamin D needs?

a: Not necessarily. One-third of twelve sun-cured alfalfa hay samples included in a recent report would have contributed less than 60 units per pound of complete brood sow ration when used at a level of 25% and the lowest one only 20 units. The highest one of the twelve samples would have contributed far less than the 500 units per pound recommended by many nutrition authorities. (Send for free reprint "The Vitamin D Content of Roughages").

q: Will it do any good to put vitamin D into beef cattle rations?

a: Very little controlled research has been done, but benefits from supplemental vitamin D have been observed in college and commercial beef herds for growing, fattening, and breeding stock. Realizing that unrecognized losses may frequently occur, many feed manufacturers fortify beef cattle rations with vitamin D.

G. C. Wallis

Send your questions about vitamin D nutrition to Dr. G. C. Wallis, Director of Nutrition, Agricultural Department, Standard Brands Incorporated, 625 Madison Avenue, New York 22, N. Y.

Fleischmann's Fidy Irradiated Dry Yeast
rich in vitamin D for four-footed animals

another fine product of

Standard Brands Incorporated

NEW WAYS TO GROW CORN

(*Continued from page* 81)

try them in moderation. Seed generally comes in 12 sizes. The following figures represent the approximate number of kernels per bushel. These amounts vary slightly from year to year:

	FLATS	
	Regular	**Short**
Large	75,000	82,500
Medium	80,000	88,000
Small	90,000	99,000
	ROUNDS	
	Regular	**Short**
Large	60,000	66,000
Medium	70,000	77,000
Small	80,000	88,000

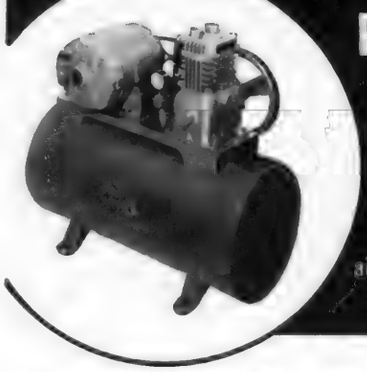
The small, short rounds and flats, which have the most kernels per bushel, are lower priced and the most economical. Since round kernels (from the tip and butt of the ear) can now be graded better than they formerly were, and since planter plates have been improved to handle round kernels more accurately, they are outselling flats in some areas. There is no evidence that the size or shape of the kernels have any bearing on growth or yield. American farmers not only want good corn, they want good-looking corn and are willing to pay a premium for the large flat kernels. But when we were in short supply due to the wet growing year in 1947, they planted the small kernels too and produced one of the largest crops they had ever grown.

Seed tags usually specify the planter plate number recommended for each make of planter. Ray Snyder says, "Don't depend 100 per cent on such recommendations. Check the seed through your own planter before planting. Worn plates, worn parts, can alter the drop. Give the planter a tune-up. Check the knocker spring. The floor plate has a *groove*. Having this plate up or down can vary the planting considerably, often making the difference between a good and a mediocre stand of corn."

Rate of Planting

Not very long ago, corn seed was dropped one or two to the hill or was drilled about 14 inches apart in the row, and little further thought was given to plant population. At the old rates, 10,000

NEW RUGGED Campbell-Hausfeld HIGH PRESSURE TANK UNITS



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- Up to 100 psi continuous, 150 psi intermittent.
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Offers years of trouble-free high volume air delivery for fast sales, satisfied customers. Write for Bulletin HP 100 today!

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The Campbell-Hausfeld Co., 181-M, Railroad Ave., Harrison, Ohio

CAMPBELL-HAUSFELD

to 12,000 plants per acre were considered a good stand. Present planters and planter plates are capable of a wide range of planting rates, offering a variety of choices to suit soil conditions.

Gordon J. Ryder, Ohio State extension agronomist, warns that many farmers are trying to boost yields by increasing fertilizer rates without increasing plant populations. In Ohio, 12,000 plants per acre are still average, though 17,000 to 18,000 have long been recommended for well-fertilized soils. Ryder said, "A lot of farmers are not planting the high rates they think they are. On 48 fields we checked, farmers had set their planters for a seven-inch spacing, or 22,400 kernels per acre. The average was 16,600 plants at harvest time. Most of the difference was due to failure of the corn planters to drop kernels accurately. High speed planting was the cause. Speed cuts yields. From 2 to 2½ miles per hour is right."

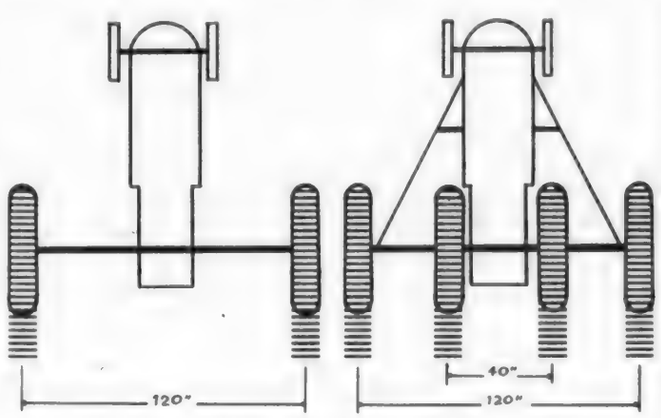
The shade produced by thick planting may reduce loss of soil moisture, but there is always the possibility that shading will retard photosynthesis. Population, like dates, should be governed by informed local practice.

The Crop Is No Better Than the Stand

Until recently, land preparation and corn planting were much alike everywhere. Fall or spring-plowed land was dragged, disked, harrowed and redisked until planted with a conventional 2,4, or 6 row planter. In 1960, most corn will be so planted, though 8 row equipment will become more than a novelty.

In the constant effort to save time and gasoline, reduce field trips, and minimize soil compaction, methods have been sought to replace conventional plowing and fitting. New equipment, new methods have evolved, varying as much as the soil conditions which prompted them. First came mulch tillage, employing the disk or deep knife to replace the plow. Power requirements and weed problems were obstacles. Adherents remain, but the enthusiasm for the method has waned. Yet the importance of plowing and cultivation had been questioned. Minimum tillage soon followed. Its modifications are endless. Most of the equipment has so far been home-made. Of the minimum tillage methods in use at present the following two deserve serious consideration:

Wheel Track: Wisconsin research workers have made this widely popular in northern areas. Regular plowing, at planting time, is followed, usually immediately, by planting with a conventional planter in the tracks made by the tractor pulling the planter in a second operation. The ground is not permitted to



Two tractor adaptations for wheel track planting.

dry out and no tilling is done between plow and planter. With many farmers, like the Hill brothers of Creston, Illinois, plowing is done in the morning, with planting in the afternoon. This system is adapted to either two or four row planting. If only one tractor is available, the big drawback is the change in wheel spacing from plow to planter, for front wheels have to be narrowed and special axle extensions added to widen rear wheels. Any arrangement works that gives each planter unit a compressed wheel tread in which to run. Planted in this wheel track, seed germination is hastened. The wheel does more than compress

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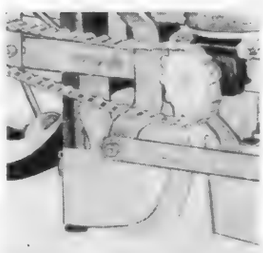
- **One-Row Units**
- **Two-Row Planters**
- **Four-Row Planters**



ABOVE: Fertilizer-opener discs adjustable to preferred placement of fertilizer — one side or both sides of row.

Row widths on BURCH PARALLEL Four-Row Planter can be narrowed to permit adding units for six-row planting. Edge-drop or "Gravity - Drop" hoppers available. "Gravity - Drop" planting unequalled for plant population: seed is elevated by means of a shelf-type cell rather than "boxed-in" as on an edge-drop plate — standard plates handle most sizes of flats or rounds. Wide range of attachments available. Mail coupon for full details and name of your nearest Burch Dealer.

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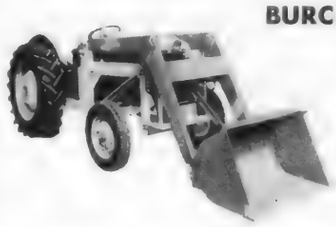

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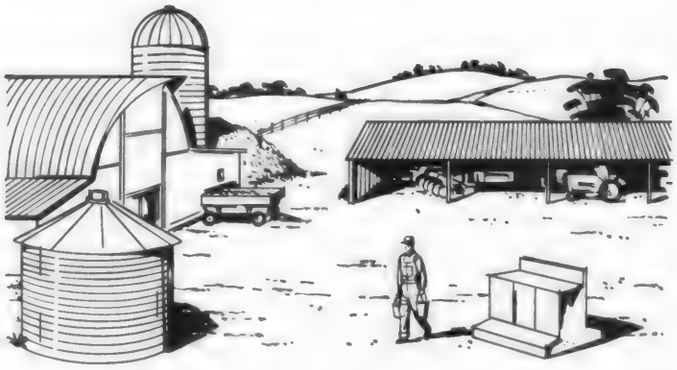


Galvanized Steel and Today's Farm

Gives greater economy, longer trouble-free life to farm buildings and equipment

A galvanized sheet is steel with a coating of zinc. The zinc protects the steel from corrosion caused by exposure to air and moisture. Because of this economical combination of strength and corrosion protection, engineers and designers are finding many uses for galvanized steel to give today's farmer greater value.

Where is it used and why?

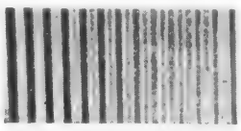
Galvanized steel is used in grain bins, feeders, wire cribs, wagons, elevators, tanks, pipes, fence, buildings. Low initial cost, ease of forming, and simplicity of application are three of the basic reasons. Galvanized steel buildings are permanent, weatherproof, fire resistant, rodent proof, and make an attractive addition to any farmstead.

Do galvanized sheets differ?

All gavanized sheets are good and give years of useful service, but they are not all alike. The heavier (or thicker) the zinc coating, the longer before maintenance becomes necessary. Galvanized sheets are made with a variety of coatings ranging from less than 1 oz. per square foot to 2.75 ozs. The heavier coatings will last 30 years or more before rusting in rural atmospheres.

What should the buyer look for?

Look for the label. Here are pictures of three samples of galvanized steel sheet that are generally available.



Unlabeled galvanized sheet — weight of zinc coating unknown.

A labeled commercial coated sheet. The buyer knows its probable rust-free life because the label says "1.25 oz. zinc coating."

A labeled sheet of higher quality, proven by time to give extra years of rust free service. The buyer knows from the 2 oz. label.

Reports from thousands of users of galvanized steel sheets come from all over the country. 2 oz. coated sheets in actual use show 21, 22, 25 years and more of maintenance-free service.

Send for free information.

A variety of literature, educational films and filmstrips is available without obligation to individuals and groups in the farm field. For more information on Galvanized Steel and Zinc, or for help on a related problem, write

AMERICAN ZINC INSTITUTE, INC.
Field Office: 324 Ferry Street, Lafayette, Ind.

ZINC INSTITUTE 2 oz. COATING SEAL OF QUALITY

the soil. On freshly-plowed ground, it also acts as a tilling tool, for tillage is mainly the reduction in size of soil particles.

Plow Plant: This has two main versions. A tractor pulls or carries both plow and planter in one operation. Generally the plow consists of three 14-inch bottoms (to turn 42 inches of soil) and a single planter unit supported behind, or to one side for the preceding round, making a 42-inch row spacing. Though only one row is planted at a time, the method is fast as so many operations are eliminated. In a second version, the plow, of any size, is sometimes equipped with a clod buster or rotary hoe section behind each moldboard; or the planter, which follows as a second operation, is equipped with a tilling device in front of each seed unit. Again the planter may trail with a standard cultivator mounted in front of the tractor. The planter may be conventional, but it must follow the plow immediately.

Choice of minimum tillage methods will vary even more in 1961. By then, two practices which were first announced in 1959 will have had wider trial. Each involves a type of strip planting or strip cultivation. University of Maryland workers favor a sweep blade which takes the place of a moldboard plow. Ohio State University workers prefer a plow followed by a cultivator similar to a rotary hoe section. In each case, only a narrow strip of sod is plowed, with the space between the rows left in sod.

Jack Baird, Illinois soils specialist, underlines a "must" in any minimum tillage method. "It takes a good job of plowing," he says. "Unevenness, uncovered weeds and large air pockets won't do. Good plowing means timeliness as well, when the tilth is right."

Yields from all types of minimum tillage have almost always been equal to or slightly higher than standard planting. "Under conditions of inadequate soil drainage, plow-plant has given higher yields than conventional methods," said N. C. Brady of Cornell University. The biggest advantages are in cost reduction, in earlier planting and in soil conservation. Several fittings are eliminated. Multiple-row planters are often unnecessary. The loose seedbed between the rows increases water intake. Run-off and erosion are reduced. Reports have come from Vernon Veatch of Roberts, Illinois, among others, that ground plows easier after having been planted for several years by minimum tillage methods.

One disadvantage could be irregular rows. This would make cultivation with 4 or 6-row equipment or picking with 2-row pickers a problem. Another plow-plant disadvantage, found last year by farmers around Ithaca, Michigan, is that in a wet fall, pickers can bog down in the loose soil between the rows. In a very dry fall, clods between the rows can make picking a rough ride.

Minimum tillage is most practical in northern sections with fewer soil-drying summer winds, but the practice has been successful in wide areas. Minimum tillage is not recommended for late planting in a dry season when big clods form. Nor does it work well in high clay soils which have not been adequately drained. Getting a seedbed with minimum tillage may be a problem on any soil where livestock have trampled and compacted a bare soil. Russ Frazier, Purdue agronomist, said, "Remember that on 'Sunday soils,' those that are too wet to work on Saturday and too dry on Monday, you will have real problems in timing your tillage operations, no matter how you plant your corn. However, it is on these soils that you will get your biggest rewards, because these soils become badly compacted under common tillage operations. With a porous plow layer instead of a compacted one, you will get better water penetration and root growth. The water moves down instead of drowning the new seedlings. Aeration is improved under minimum tillage and tile drains seem to work better, assuming that the soil has been worked at the proper time, which is at the same stage as for good plowing. Since the land is usually gone over only once, correct timing is important."

Planting Patterns

Our 40-inch rows, often planted the narrowest width of a field, are a holdover from horse farming. Then, when 10,000 plants per acre were normal, rows had to be spaced to accommodate horses. The rows were short to allow the horses to rest at the ends. Of the many more recent innovations in planting patterns, several are worth a trial. H. J. Mederski of the Ohio State Experiment

"It Took an Alcoa Gate to Sell the Bull"

"Fellow came here to buy one of our registered Polled Hereford bulls a while back," recounts Maurice Wagner, stock farmer at Eau Clair, Pa. "One young bull in particular took his eye right away.

"I made him a fair price but he stalled, kept looking around, wouldn't come to terms. Finally he told me what was holding him up. 'You throw in one of those Alcoa Gates you're fixing to hang and I'll pay your price,' he said.

"I gave him the gate. I hope he likes it as well as we do ours. We have 30 of them on the cattle pens and across the farm. Some have been up three years now; 28 are as bright and sturdy as the day we got them. We had trouble with the other two, but it was our own fault. We hung them wrong.

"Whenever I replace a gate now, an Alcoa Gate goes in its place. They're easy to hang and we don't have to paint them.

"They're easy to open and light to handle, too. That's important to us, because my wife and the children use these gates as much as I do myself," Mr. Wagner states.

Horse High! Hog Tight! Bull Strong!

Alcoa® Aluminum Gates are built rugged, built like a bridge. They can't sag, rot, corrode, warp or twist. Beaded edges, aircraft riveting, made of an extra-strong aluminum alloy. Come 52 in. high, five or six panels, complete with hardware. In widths for 10-ft, 12-ft, 14-ft and 16-ft openings. A 36-in. hog gate also is available.

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This 13-year-old is carrying a 36-pound coil of pipe, yet it is enough to carry a 1-inch flow of water 300 feet. Extruded from DYLAN® polyethylene by quality plastic pipe manufacturers, it is the most versatile pipe yet devised for use on the farm.

Rust or corrosion no problem. You never need worry about rust or corrosion in this pipe. Furthermore, normal freezing will not damage polyethylene pipe. This means you need bury pipe only 6" for permanent water system installations.

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Withstands normal water pressures. Most polyethylene pipe carries pressure ratings of 75 or 100 pounds per square inch. 75# per sq. in. pipe is suitable for most farm water systems that operate at pressures of 20#—40# per sq. in.

Lower cost. Ease of installation makes a pipeline using DYLAN polyethylene pipe both quicker to install and less costly.

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Size	Weight per 100 feet	Length Coils
1"	12 lbs.	300; 1,000
1¼"	20.5 lbs.	300
1½"	28 lbs.	250

Approved for household use. DYLAN polyethylene pipe that carries the initials, "nSf," shown on the seal at the bottom of this page is approved by the National Sanitation Foundation for use in drinking water installations. Other farm uses for polyethylene pipe include: irrigation systems, livestock watering, sewage systems, drainage systems and lawn sprinkling systems.

Send for literature. Koppers has two booklets entitled, "Polyethylene Pipe—Yours For Better Living" and "How to Select and Install Polyethylene Pipe." We would be glad to send these to you if you would like more information and the name of your nearest quality DYLAN polyethylene pipe manufacturer. Write to Koppers Company, Inc., Plastics Division, Dept. FQ, Pittsburgh 19, Pa.

This seal of the National Sanitation Foundation means Tested . . . Approved . . . Sanitary . . . Dependable Strength.

KOPPERS KOPPERS

Station favors narrow rows. He said, "With 40-inch rows, we may be wasting too much real estate." For 20-inch rows, a 40-inch planter can double back. A 16-inch stalk spacing in a 20-inch row gives a plant the same area as an 8-inch planting in a 40-inch row. Dr. Mederski said, "To get 20,000 plants in a 40-inch row, the plants must be squeezed 7 inches apart. Reducing the row width is the only way out for higher populations. In repeated tests, narrow row corn gave higher yields, far fewer nubbins, fewer earless stalks and 20 per cent more dry stover. Narrow row corn must be picked with a one-row picker, if harvested for grain, but manufacturers are considering new machinery designs to improve harvesting."

Daniel Friedly, an enterprising farmer of Van Wert County, Ohio, plants his corn around the field, rather than back and forth. He starts at one corner and proceeds around the field, lifting the planter at each corner and ending up in the center of the field. A path 4 or 6 rows wide is left from each corner to the center. About a week later he plants 4 to 6 rows of a very short season hybrid through each corner to the center. This is planted very heavy so cultivation of the main body of corn will not reduce the stand too severely.

The late-planted corn matures and is harvested first. The rest of the field can then be harvested with a pull-type picker without any need for opening up lands or empty driving at the ends of the field.

Insect and Weed Control

For soil insects, Aldrin and Heptachlor give good control. They may be applied in the granular form, as a band-spray treatment, in solution, mixed with liquid fertilizer or ready-mixed in purchased dry fertilizer. They likewise keep grasshoppers in check; Dieldrin and Toxaphene can also be used for grasshoppers. Corn borers respond well to DDT sprays. These and other chemicals, if applied no later than two weeks before harvest, will give no residue problems and no cranberry scares.

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Driven by powerful 12.9 h.p. Onan air-cooled engine, the AEA-200-L is a rugged and reliable welder/power plant for use anywhere!

Electric starter and various wheel mounts available. Complete specifications and interesting folder "How to Thaw Frozen Water Pipes" sent promptly upon request.

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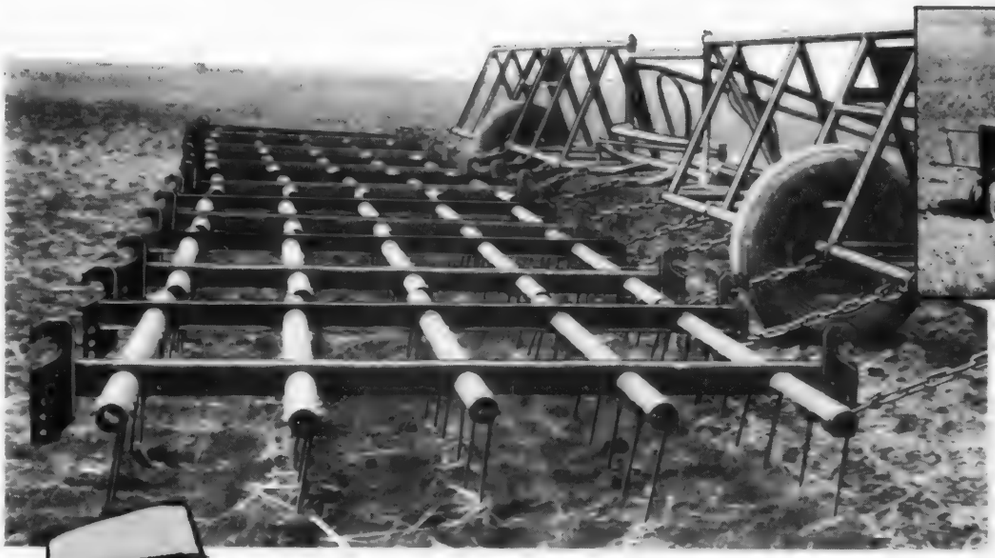

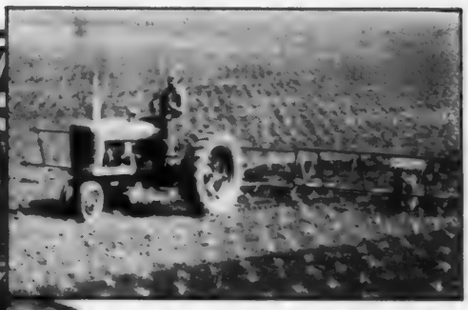

USE IN ANY DIRECTION—Down the row, across the row, or diagonally. The Harroweeder does a better job than any other machine. Use it diagonally across rows to assure cleaner, leveler fields with better root set for extra yields. It's easy to operate; requires little skill, doesn't need hydraulic system.

TEETH ARE STAGGERED to cover every inch of soil. Their small diameter prevents plugging in trashy fields and gives effective penetration without unnecessary weight. Each Harroweeder section is free to follow terrain independently. May be used in rocky fields without damage.

Compare the Farmhand Harroweeder with the cultivating equipment you now own!

NO CROP DAMAGE—Flexible teeth work around crop stems combing out weeds and breaking crust, without disturbing crop roots. Even in-the-row weeds are kicked out. Can also be used on taller crops without damage. New sections permit easy removal of 2 rows of teeth for extremely gentle action in earliest growth stages if it appears desirable. Castered gauge wheels available to control penetration in some soils.

YOUR PRESENT CULTIVATING TOOLS, regardless of price, size or type, will come off second best when matched against the unique Farmhand Harroweeder. It's both a harrow and a cultivator, with a 7-year record of increasing yields and cutting costs in corn, cotton, soybeans, sorghums, sugar beets, potatoes, and small grains.

Cultivate up to 200 acres a day with the Harroweeder and reduce the hazard of being caught by bad weather with only part of your cultivating done. You'll get at those weeds faster, when they're most vulnerable . . . and as many times as necessary to insure cleaner fields, bigger yields.

The secret of Harroweeder's amazing performance is in the "vibracoil" action of the patented coil spring teeth. Every inch of soil is vibrated and combed . . . crust is broken, weeds are uprooted, air pockets disappear, soil is leveled, moisture is retained.

There's a Harroweeder to fit your needs—from 13′ 3-point hitch model to giant 55′ unit. All but two models quickly fold to 7′ for easy transport. Try a Harroweeder in your fields soon. Your Farmhand dealer will be glad to arrange for a demonstration.

MORE ACRES PER HOUR MEANS LOWER LABOR COSTS!

The Harroweeder substantially reduces the amount of tractor operator labor required for cultivation. This is due primarily to the wider swath. Where much hand labor is required for thinning and hoeing, as in cotton and sugar beets, the labor savings are larger.

Harroweeder Models & Coverage Widths

Harroweeder Width	TRACTOR REQUIRED plow size	NUMBER OF ROWS COVERED (Circled numbers indicate complete coverage without doubling back on any row)					
		22″	28″	36″	38″	40″	42″
13′	2	7	5	(4)	(4)	(4)	3
15′	2	(8)	(6)	5	(4)	(4)	(4)
20′	2-3	(10)	(8)	(6)	(6)	(6)	5
25′	2-3	13	(10)	(8)	(8)	7	7
28′	3-4	15	(12)	9	(8)	(8)	(8)
35′	3-4	19	15	11	11	(10)	(10)
45′	4-5	(24)	19	15	(14)	13	(12)
55′	5-6	(30)	23	(18)	17	(16)	15

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The Summer issue of Farm Quarterly will be available at your Newsstand on May 6.

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Shoulder high in 49 days, this field made 4 tons of hay per acre on 1st cutting!

Produce low-cost livestock feed, rich in protein and Vitamin A, ideal for grazing, hay or ensilage

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Growers say—"Best forage crop we've ever tried, beats anything!"

This new *high-production strain* of Sorghum Almum Grass was introduced from Australia just a few years ago. In the last two years, stockmen in every part of the nation have tried it with outstanding success. Plantings on both irrigated and dry land show high production on many different types of soils, from clay to blow sand, under a wide variety of growing conditions.

Grows from 5 to 14 feet tall. Leaves are broad, shiny-green, rich in vitamins. At proper cutting time, stalks are succulent, tender and sweet. Makes an ideal forage that all livestock like. Yields heavy tonnage — up to 30 tons or more of ensilage, 8 to 12 tons of hay per acre are reported.

Hundreds of enthusiastic letters from Florida to Oregon, New York to California say—"Everything you said it was," "It's the coming hay in our part of the country," "Beats anything we've ever tried," "Best pasture I've ever seen," "Increased both our milk production and cream test," "Cattle go for it like kids eat candy."

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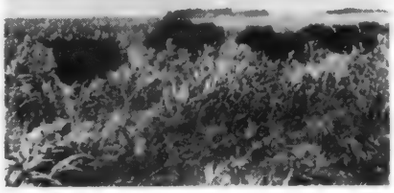

GRAZING REPORTS show low-cost beef gains, increased milk production for dairy cattle, seasonal capacity of 2 to 5 head per acre. Yearlings gained over 2 lbs. per head per day without supplement in many tests. Sheep, horses, hogs and goats like it and do well on it, producers say.

PALATABILITY TESTS in Colorado show cattle and calves often prefer Sorghum Grass hay to good alfalfa. Equally good for feed when green chopped, dehydrated and pelleted, or dried in bundles. Dry winter stalks test up to 9% sugar, make ideal roughage for mother cows or yearlings.

"Most promising new crop to reach the U.S. since alfalfa," Stockmen declare.

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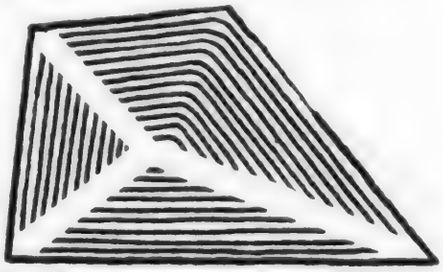
J. W. Pendleton, Illinois crop specialist, found that many farmers were expecting too much of 2,4-D as a weed killer. "With 2,4-D, primarily for post-emergence," he said, "morning glories, cockleburs and ragweeds can be killed at any stage of growth. Jimson weed, lambsquarters, smartweed, pigweed and buttonweed should be hit when they are small. 2,4-D won't phase bullnettle or grasses once they are up. Simazine, Randox and Atrazine, all primarily for pre-emergence treatment, give good grass control. Because of their expense (about $7.00 per acre for full coverage as against $.50 per acre for 2,4-D), band applications are suggested." A 13-inch band reduces the cost one-third. The table below indicates how much you can afford to pay for chemical weed control.

This table shows how pigweed and foxtail can cut corn yields. Randox, Simazine and Altrazine, though costing about $7.00 for full coverage per acre, can be reduced to one-third by treatment in a 12-inch band, costing about $2.35 per acre, with no application costs if applied by the planter. At that price, with corn at $1.00 a bushel, an increased yield of only 2½ bushels per acre would justify band application. In tests, the weeds were reduced by hand to the spacings given:

Foxtail plants per row	Corn bu.	Pigweed plants per row	Corn bu.
Thick stand	70.7	Thick stand	71.8
1 plant each 1 inch	77.8	1 plant each 1 inch	75.8
1 plant every 2 inches	82.0	1 plant every 5 inches	78.2
1 plant every 4 inches	84.8	1 plant every 10 inches	86.5
1 plant every 12 inches	88.4	1 plant every 20 inches	87.1
1 plant every 24 inches	90.6	1 plant every 40 inches	94.4
Clean row	93.5	Clean row	102.0

This year both 2,4-D and Randox will be available in granular form. Granular herbicides save time. Also the weight of liquid sprays is eliminated.



Daniel Friedly plants around the field leaving lanes to the center which are planted later.

Is cultivation necessary? With good chemical weed control, cultivation of some soils is needless. With other soils, though weeds are no problem, cultivation promotes growth by reducing compaction. Stirring lets in air. Conversely, minimum tillage planting, which reduces field travel, also decreases compaction and lessens need for cultivation.

Cultivation for weeds has by no means gone out of use. Cornell University workers found a cultipacker-weeder to be the best tool for young corn planted minimum-til-

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lage style. The use of a cultipacker when corn is from 6 to 8 inches high can boost yields several dozen bushels per acre. Weeds can be controlled and the ground leveled for ease of harvest in one fast operation. Light compaction is in itself a type of cultivation. Because minimum tillage uses a rough seedbed, unfavorable for weed germination, more than one cultivation is seldom necessary, especially with the plow-plant method. By reducing cultivations, root pruning is also reduced. Almost everywhere, rotary hoes to kill small weeds in early corn have proven the fastest and surest means of cultivation.

Chemical band treatment works well in combination with cultivation or minimum tillage-planted corn. In 40-inch rows, a 14-inch band of chemical is sprayed on each row. This leaves only 28 inches that has to be cultivated. Even if the rows are not too straight, the 28-inch strip can be cultivated fast without injury to the corn. The band treatment works well where normal cultivation is difficult in narrow row corn; early cultipacking and rotary hoeing may be the only cultivation possible with narrow row corn.

Sit and Wait

After the corn is laid by, there are few choices to be decided until harvest, unless fertilizer or weed or bug killers are to be applied. Few farmers will have the equipment for topping, which has come into the picture again after a long sleep. The practice consists of late-season cutting of the tops of the stalks by rotary blades mounted on a highboy. It lessens lodging and cuts down on the material passing through harvesting machines. There is still a question whether the returns offset the cost. The main return seems to be in pride. Topped fields are beautiful to behold.

The many fresh approaches open to corn growers are rapidly catching on especially among the younger farmers. Corn has become more of a challenge. A large part of the credit is due that generation which brought a quickening awareness of innovation in progress back from those years in military service.

BOOKS THAT TELL STORIES

(*Continued from page 75*)

account cooperators.

Johnson and Hawley kept in touch. Doris Hawley would write occasionally to Lorna Johnson and on the back of her letter Harold would scratch a few notes about how to increase the net income from corn. And the next time Lorna wrote to Doris there, scribbled on the back of her letter, would be Dutch's figures on corn.

In one series of such notes Hawley wondered if, while Dutch was getting 10 bushels more corn per acre on his rich prairie soil in Illinois, the high cost of the land might be eating up the difference. Dutch, not at all convinced of this, pointed out that Hawley was probably putting that much more into fertilizing his corn. They did a little pencil work because the comparison between corn costs in New York and Illinois fascinated them. Johnson charged $15 more per acre against his crop for land than Hawley did and this, according to their books, was slightly above the cost of the added fertilizer Hawley applied.

Johnson's methods of bookkeeping have changed somewhat from Hawley's plan, and Dutch now keeps farm accounts on the system of the Illinois Farm Bureau Farm Management Service which, although it is considered one of the better systems of its kind, is considerably less detailed than the books Hawley insists on keeping.

It's really Lorna Johnson who does most of their bookkeeping. "A few years ago," she says, "Dutch had some back trouble and I took over. It's simple enough to do. I catch the books up before the field man from the farm management service is due. He comes about three times a year." There's one other advantage in having Lorna keep the books; she always knows the farm business and, should the need arise, could easily take over the farm now that the Johnson boys are getting big enough to handle machinery and feeding.

The basis of the Illinois system is to let each of the farmers in the plan compare their operation with the records being made by similar farms. This, too, is something Hawley does in New York. "This doesn't give us complete cost profit figures by enterprise," Dutch admits, "but here in good beef and hog country we can tell with these records how well we're doing." The service costs him $60 a year.

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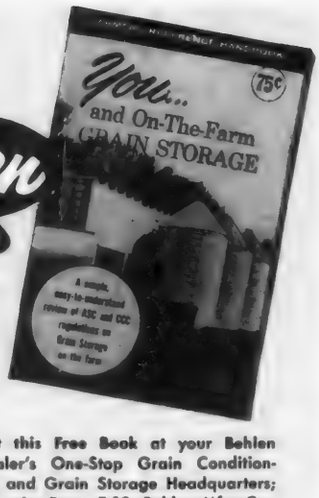

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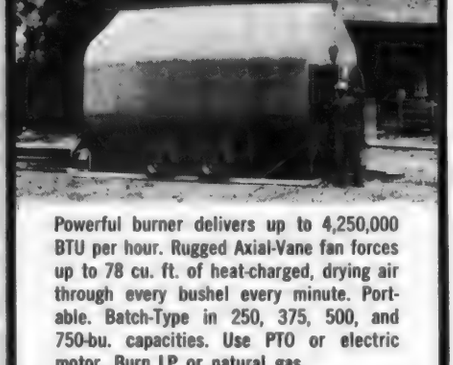

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The Johnsons recently made a major change in their farming operation. Until last year they operated a large tenant farm, where they lived for years, as well as their own 200-acre farm near DeKalb, Illinois, for a total of 530 acres. Dutch employed two hired men. Now he has given up the tenant operation and moved to his own 200 acres. "Our plan," he says, "is to mechanize and get along without hired help. Our labor cost last year was $7500 in addition to the cost of keeping tenant houses up."

The Johnsons, with a new automatic feeding system for the cattle and a confinement barn for the hogs, are already approaching their goal of raising 1,000 hogs and feeding out 150 to 200 head of cattle a year. "Hogs and cattle have been real good to us," Dutch said. Last year they grossed $65,000 on hogs.

There is on the Johnson farm one animal whose feed Dutch begrudges her. The Johnson milk cow gazes benignly from the window of her shed at the changing farm scene.

"To show you how ridiculous it is," Dutch said, "it takes me as long to take care of that cow as it does to do the work for 150 head of feeders. This is her last year."

The Johnson cow might have made the trip long since if her performance were scored as closely as Hawley keeps tabs on the individuals in his big milking herd in New York. Milk is the big crop on the Hawley farm and while nothing there escapes Harold's critical recordkeeping, except the orchids Doris raises, the cows perhaps get the most careful scrutiny of all. The major figure that Hawley wants to draw from his cow records is the average cost per 100 pounds of milk.

To get this he simply keeps notes on the cost of everything that goes into milk production and adds up the figures. It takes longer to do this than it does to say it. To get at this, Dr. Hawley makes notes on how many bales of hay they're feeding daily and how many pounds of grain, silage, supplement, salt and minerals the cows consume. One day recently when we visited his farm, he had notes in his pocket to show that the cows ate that day 22 bales of hay, which he figures at an average weight of 50 pounds each, 2,350 pounds of silage and 475 pounds of grain. To double-check the hay figure Hawley counts the bales as they go into storage and again at the end of the winter. The difference is what he fed.

In addition to the feed they consume, the cows are charged with a series of other costs that go into operating such a dairy farm. D.H.I.A. service is charged against them and the cost of artificial insemination, veterinary service, barn rental and depreciation of buildings and equipment used in milk production. The cows must also, says Hawley, carry their share of the cost of electricity, telephone and insurance.

Then there is labor, and here Hawley charges the operation $4 an hour for his own time which he considers little enough

(*Continued on page* 133)

D. Howard Doane, founder and Chairman of the Board of the Doane Agricultural Service, Inc., world's oldest and largest organization engaged in Farm Management, Rural Appraising and Agricultural Research.

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From the very beginning, Doane Agricultural Service has been dedicated to the upgrading of farm management. Today's entire Doane staff (150 farm-reared, college-trained men with experience and special training for the duties they perform) works to provide professional services to agriculture, business, industry and the community. These services are varied—they encompass all phases of Farm Management, Rural Appraising and Agricultural Research.

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Doane assumes complete supervision, planning the operations, securing tenants, buying supplies, selling farm products. A Doane manager, by virtue of his special training and experience, can analyze farm problems and recommend the best type operation (crop share, livestock share or hired labor)—and the most profitable combination of farm enterprises. He will make written reports, keep tax records, prepare budgets and submit an overall operating program.

A quotation on the management fee on any farm or ranch will be given without cost or obligation.

2 FARM MANAGEMENT PLANNING

Doane's qualified management staff prepares complete operating programs for owners or operators of farms, or ranches or citrus groves anywhere. After an intensive study is made of the property, a written report is submitted covering all phases of farm management. Income and expense budgets are made. This report becomes the basic plan and operating guide for the property.

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All the experience and judgment of Doane farm managers, price analysts, engineers and economists is used in preparing a Precision Farm Programming study. High speed computing equipment is used to compare the relative efficiency of different types of operations for individual properties. The supply of land, labor and capital is taken into consideration. For instance, a given enterprise might make good use of land and capital, yet "waste" labor. In another case, the reverse might be true.

The result of a Doane Precision Farm Planning analysis is the program which will produce the highest net income from a farm or ranch.

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6 APPRAISING

A Doane appraisal not only gives the present market value of a property, but also the long-term income value.

Property is appraised for guidance in buying or selling property, insurance coverage, condemnation, crop damage and estate settlements. The value of the agricultural real estate is based on the earning power of the property, adjusted for location and other factors.

Doane is also prepared to set up reappraisal programs for states, counties or towns, to assist assessors in training and supervising reappraisal personnel, and to act as consultants to taxing bodies.

7 MARKETING RESEARCH

The Doane Marketing Research staff serves companies that sell their products to farmers and ranchers. Proven market research techniques and first-hand knowledge of farmers' problems are available through:

(a) *Consultation Service* . . . Offered to manufacturing and marketing organizations on a retainer basis.

(b) *Farm Panel* . . . A nationwide representative panel of commercial farmers is available to provide prompt and accurate information to companies selling the farm market.

(c) *Testing Products Sold to Farmers* . . . Nationwide or regional evaluation of products under many types of farm conditions is provided for companies selling to agriculture.

8 AREA DEVELOPMENT

Every agricultural area should take a critical look at its economy. In many cases production of new crops and livestock products is needed and less emphasis given to some now being produced. Good markets are essential—new and better ones may be needed.

The job to be done is not for farmers alone. They should be joined by the bankers, the merchants, the teachers, the newspapers, the radio and TV stations and the professional men.

Area development injects new life and dollars into a declining economy. It gets town people and farm people pulling together as a team. It develops community pride.

The Doane Agricultural Service has been assisting communities with Area Agricultural Development programs for 14 years.

9 DOANE AUTHORIZED BUILDER SERVICE

The Doane Authorized Builder Program is another service to farmers. Savings in materials and labor with Doane-Designed® buildings depend upon the use of quality materials and competent construction crews.

Reputable individuals and firms have been selected to provide this needed service in local farming areas. Trained construction crews use efficient construction methods. Doane field engineers continually check the material and workmanship of Doane Authorized Builders to assure you that the black and yellow sign symbolizes high standards of quality for material and workmanship. For the location of the Authorized Builder nearest you, check "9" on the reply card.

For more information without obligation, merely tear out this postage-paid reply card, circle the item numbers (1, 2 etc.) for the Doane services in which you are interested . . . you will receive a prompt reply. This card can also be used to order the Doane Agricultural Digest.

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Potent Soxipent gives you a near-perfect weapon against mastitis and its double threat . . . damage to infected stock, and the certainty of its spread to healthy animals if unchecked.

Use Soxipent to destroy mastitis-causing bacteria. Use Soxipent to heal diseased and inflamed udder tissues. Combines 2 selected antibiotics and 2 sulfas, with cobalt. Provides broad bactericidal action, fast results. In a micronized emulsion for soothing treatment.

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STERLING SALT PUTS A PLUS IN FEEDING PROGRAMS

Mr. Robert Moffat, Jr. of Grayce Farms, Dalton, Pa., exhibits champion Guernsey cow— Haddon's M. Ida

. . . by protecting animal health. Sterling Blusalt helps protect against the danger of trace-mineral deficiencies by supplying salt and seven vital trace minerals in scientifically derived proportions (manganese, iron, sulfate sulfur, copper, cobalt, iodine and zinc). This contribution to the over-all health of the animal helps promote adequate feed intake and greater milk production. Feeding healthy livestock makes your feed dollars go further. Get a supply of Blusalt from your feed dealer and try it! Blusalt is available in 50- and 100-lb. bags, 50-lb. blocks and 4-lb. Liks. If you have any specific questions about salt and animal health, write to International's Animal Nutrition Department, Watkins Glen, New York.

Service and research are the extras in

STERLING FARM & FEED SALT

INTERNATIONAL SALT COMPANY • CLARKS SUMMIT, PA.

Real Salty Salt!

(*Continued from page* 128)

for management. His sons, Bruce and Steve, are rated at current cost of hired labor, $1.50 an hour in summer and $1.00 in winter.

Hawley doesn't fudge on these accounts. He keeps the records to help him build a more profitable operation and anything but a literal accounting of costs and income would work against him. On feed that is produced on the place, for example, the cow account is charged at market price, or cost of production, whichever is higher, because Hawley insists that feed is as valuable produced by him as by anyone else. "How will I ever know," he asks, "just how much profit my cows are making me unless I know definitely what it costs me to keep them in production."

Take a closer look at Hawley's cow records. Hay consumption is almost predictable during winter months and Hawley needs to figure it up only about once a month. His silage figures are based on what the D.H.I.A. tester weighs once a month. Hawley knows how many hours of labor the herd requires at various seasons, and it's simple enough for him to pro-rate such things as utilities and depreciation. Obviously, many of his milk production costs are standardized and, once his books are set up, keeping them up to date becomes a fairly easy task.

Then there is the credit side of the ledger and here are totaled income from milk, bull calves sold, value of heifer calves kept for the herd, value of manure and sale of cull cows. Hawley relies on the D.H.I.A. records to show him what individual cows are accomplishing. From his own records he wants to know the actual cost of every 100 pounds of milk sent to market and he's looking at the total dairy enterprise instead of the individual cow.

These records can tip him off on ways to cut costs and consequently increase net profits. Labor, for instance, is a major cost and Hawley has found some ways to cut labor. Instead of carrying two pails of milk to the milkhouse and straining it, they now strain directly into four cans hauled on a cart right to the cow. The result? Milking is done with one less boy.

Hawley took a careful look at the labor required to feed his cows. Three or four times a day somebody was busily shoveling hay and silage to them. Then Hawley found that they could put the total day's roughage in front of the cows by six o'clock in the morning and, according to his D.H.I.A. records, not lose a pound of milk. He still feeds supplement at milking time.

Hawley figures the day is coming when he will have to install a bulk milk tank. So far, his books haven't convinced him the investment would be sound. He does his own hauling to the milk plant a mile and a half away. When the economic trend pushes him out of the hauling business, which Hawley feels is certain to happen, and he has a hauling charge to pay, the time will have come when a bulk tank will be profitable. He is convinced that he isn't going to install a bulk tank until he can also install the complete pumping system and eliminate handling of pails and cans.

Hawley's barn itself is a burden when it comes to planning such improvements. His cows are stanchioned in two long rows and pipelines for water and milk in such a place run to high figures. Last summer the barn next to the big barn caught fire and the wind was blowing flames right toward the cowbarn. Hawley, after several hours of firefighting, saved the "old-fashioned" barn. He sometimes wishes now he had been in town that day. "Been the best thing that could have happened to me," he says.

Eventually Hawley plans to go to a milking parlor for at least part of his expanding herd. Cows milked in the parlor will be loose housed and probably others will still be held in stanchions. Hawley's herd has already grown from 25 to 65 cows and will likely double that within the next three years.

When it comes to keeping records on field crops Hawley's accounting is, if anything, even more detailed. With a glance at his records he can tell the exact loss or profit from any crop he grew on any of his fields in a given year. He has looked several times at the figures on his 1954 oat crop, when oats, always a risky crop for him, cost him $44 an acre to produce and returned $32.

A look at the Hawley records shows plainly enough how he arrived at the cost figure. There are costs listed for the man hours and tractor hours required for disking, sowing and spraying with

Push-button Power-Choring
for dairymen from
Jamesway®

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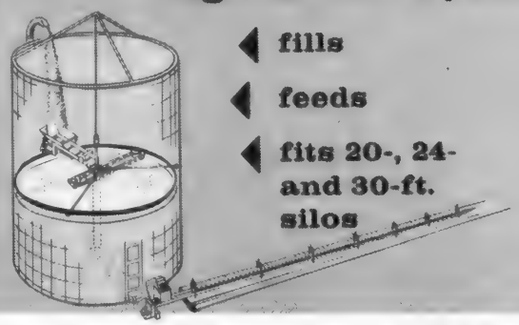
Big Jim Silo System!



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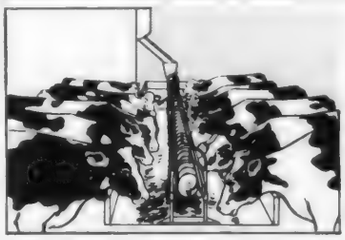

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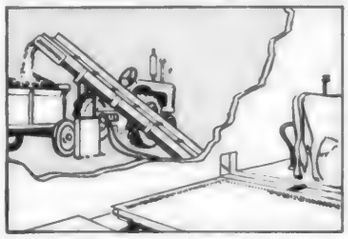

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Save $300 or more with this new Shuttle-Stroke Cleaner and elevator. Powered by Jamesway hydraulic pump from your tractor's PTO shaft. No motor, wiring costs. High speed 95′ a minute elevator gets liquids up into spreader.

Mail a postcard today for more information on Jamesway Power Choring dairy equipment. Write: James Mfg. Co., Dept. FG-30, Fort Atkinson, Wisconsin. Or see your Jamesway dealer.

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VERSATILITY costs no more

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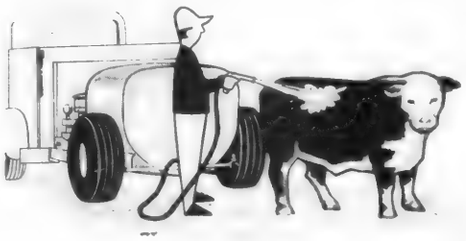
Adjustable pressure regulator means you can custom-tailor spray applications for all farm spraying jobs. *High* pressure for cattle spraying — *low* pressure for weed control, a *versatile* Myers General Purpose Sprayer does the job quickly, efficiently and economically.

Check these important features

Capacities from 10 to 20 GPM and pressures from 50 to 800 psi. Myers sprayers are well balanced for easy and convenient towing. Rugged construction insures long life. Epoxy-coated tanks last years longer — resist the most corrosive spray chemicals. Two-wheel trailer models are available with engine or power-take-off. Engine driven skid models are also available.



Versatile Myers sprayer is ideal for high pressure spraying of cattle and orchards. Here's real penetration for cleaning and disinfecting.

Used with boom, this same versatile Myers sprayer is perfect for weed control and other row-crop spraying jobs. Rugged construction insures long life.

For complete information and prices on these new sprayers and accessories, see your Myers Sprayer Dealer or write to:

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2,4-D for each variety he planted. Seventy-four man hours are listed for combining plus 24 hours operation of the self-propelled combine, 12 man hours and 60 truck miles to store the grain and 10 hours of man and tractor time for baling straw. The stubble still puzzles Hawley because he can't figure out whether to charge it to the oats or to the following crop which may benefit from it.

There is also the cost of chemicals for spraying, the cost of 1⅝ bushels of seed per acre and 300 pounds per acre of 8-16-16 fertilizer, and an $8 per acre charge for the land. Oats, obviously, is a touch-and-go crop here, as it is on many farms, and Hawley sticks with it because on the average he has found ways to turn a slight profit on it.

Hawley not only wrote down the figures, he also used them to help him improve his income from oats. Some farmers, he learned, were getting by with less labor on their land than he was so he reduced labor without cutting yields by fitting the land somewhat less than he used to. He used larger equipment to reduce labor. He changed from a sprayer that covered a 20-foot strip to a 40-foot one. Then he made further labor savings when he went to a self-propelled combine.

In 1954, using a bagger combine, Hawley had to keep one man on the combine to tie bags, put them into a wagon, haul them to the barn and hoist them out of a wagon. When he went from that to a bin combine, which augers directly into the grain wagon, he cut harvesting labor two-and-a-half hours per acre. The self-propelled combine increased the harvesting efficiency still more.

Not all the crops Hawley has tried have fared so well once they begin to slip in the profit column. Hawley and his wife agree that probably no place else have the records been so valuable as they have in telling them what to get out of. Some years ago they produced three batches of broilers every winter. Then their records revealed that, as southern producers cut the prices, northern producers were feeling the squeeze. The Hawleys quietly backed out of the broiler business before they got hurt. The same thing happened to a 2,000 bird flock of layers.

There was a time, too, when they produced considerable sweet corn on contract to a canning plant. But Hawley studied his records and learned that he could make more by growing "husking" corn for feed and the cash market. Exit sweet corn.

One other crop they dropped as a result of record analysis was canning peas. The peas were turning a profit but the labor peaks came at haying time. Hay to Hawley is a vital crop so rather than take a chance on hay quality and perhaps cut milk production, peas, too, went the way of all questionable Hawley enterprises. "We found," he said, "where we made a buck on peas we were losing a buck on the quality of hay."

Save Half on Fertilizer

Hawley, flipping the pages of his farm records, turns to fertilizer and says, "Why don't more people do something like this?",

Making oat silage is one of the latest, most practical ways to make this crop pay. Lundell "Super 60" crushes stems for better packing—is a top, farm-proved oat silage maker.

One acre does the work of two or three when you green-feed grasses and legumes or put up grass silage. Especially designed, clean-cut hammers cut grasses and legumes evenly.

A special row crop attachment for the Lundell "Super 60" simplifies and cuts the cost of making corn silage. Corn Head Attachment has only one main moving part.

Only ONE Machine Does These Year 'Round Farm Jobs

Lundell the first name in flail-type harvesters

The versatile Lundell "Super 60" Forage Chopper is designed for year 'round farm use. It *Cuts* • *Chops* • *Shreds* • *Mows* • *Crushes* • *Conditions* • *Windrows* • *Grinds*

**Many patented features & attachments*

Big New '60 Features:

Now 5 big attachments to do 28 farm jobs. New exclusive feature lets you mount or dismount all attachments in 5 minutes. Also available, Finest Flail-Cut Kit for grass silage, and new Row Crop Head for finest cut corn silage — six 18" long knives deliver 9000 cuts per minute.

. . . shreds stalks for soil conditioning.

. . . chops hay out of windrow.

. . . grinds corn, small grain, cobs, baled hay, etc.

. . . busts bales for fodder or bedding.

In one operation you can mow, condition and windrow your hay crop. Saves time, money, labor.

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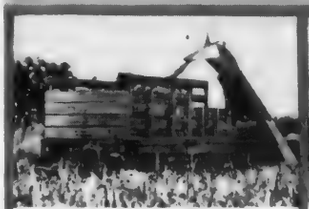

. . . cuts broadcast cane.

. . . cleans weedy pastures.

. . . shreds stalks for bedding.

. . . saves a down crop.

NEW SEEDER and FERTILIZER SPREADER HAS A HUNDRED USES—COSTS ONLY $72.75*

Topdressing pasture with the Cyclone Power Seeder—covers 20 acres an hour

Every farmer in the Farm Quarterly area could spend more time fishing and have more fun farming to boot, if he owned one of the handy new Cyclone Power Seeders. Whether used for sowing a cover crop, reseeding a pasture, sowing small grains, legumes or grasses, top-dressing nitrate, applying potash and phosphate, or spreading granular insect killer, the Cyclone does a fast, accurate job—spins out up to a 30-foot swath! Shown above is the 3-bushel power-takeoff model with heavy duty flexible shaft, double agitator, easy-setting rate gauge, and positive shutoff. Extension hopper adds 2 bu. to capacity.
Sweet-running, electric model, below, is best yet for sowing cover crops.
Buy them at your farm machinery dealer or write Cyclone Seeder Co., Inc., Urbana 47, Indiana, for more information.

*Model S-3 F.O.B., Urbana, Indiana

Front mounted electric Cyclone

The famous Cyclone Hand Seed Sower

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Turn wasteland into profit. Our famous Christmas Tree Growers' Guide tells you how. Write for free copy.

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and he proceeds to explain that many farmers could save up to half their fertilizer costs. "We are buying high analysis fertilizer," he says, "10-20-20 as compared to 5-10-10 which is the most common one used around here. This automatically gives us a discount and saves about 25 per cent per unit of plant food. Then we save $4.50 a ton by buying before the 19th of December and we get another 2½ per cent off for cash. We haul it ourselves and save another $1.50 a ton after charging for the truck and labor. People who buy fertilizer at planting time," he says, "and pay for it on a time basis, have another 15 per cent added to the base price. Compare the two. By buying high analysis early, getting a volume discount, paying cash and hauling it myself, fertilizer costs me 50 per cent less per unit of plant feed than it costs some people."

Hawley watches fertilizer prices closely because this is a major expense in his operation. He's noted for fertilizer applications which some neighboring farmers consider foolishly high. In spite of his heavy use of fertilizer, Hawley admits that his corn yields fall about 10 bushels below the harvest figures which Dutch Johnson records out in Illinois. "I've been buying new farms and it takes me about three years to get them up to the production level of the rest of my land," Hawley said. "Maybe someday I'll be able to match Dutch's yields."

To build production Hawley pours the plant food in his new farms. In 1958 he bought some bottom land. The former owner, who was known as a "good farmer" in the neighborhood, always had his buildings painted, his hedgerows trimmed. "And," says Hawley, "he put a hundred pounds of fertilizer per acre on that bottom land whether it needed it or not!" Then Hawley moved in with one of his typical fertilizer treatments and began building corn yields on his new bottom land. "Yields there," he says, "were still 25 bushels per acre below those on the home place."

Both Hawley and Johnson are considered top farm operators in their communities. Both are active in outside programs, farm organizations, youth work, church and social work. Both of them credit their wives with playing major and active roles in the actual bookkeeping and in helping make important final decisions. "Dutch has the last word," says Lorna Johnson, "but we always talk everything over." And both of these farmers have boys who are now big enough to help take over some of the actual work in barn and field.

Although one of these farmers works a New York dairy farm in rolling and rock-strewn soil, and the other, a fertile prairie farm where land is worth more than $500 an acre, there is a similarity in their approach. Farm operation for each of them has been a constant search for ways to increase production and cut costs. And the major tool toward accomplishing this in each case has been a good system of farm recordkeeping.

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Prevents crushing or overlaying by sow!

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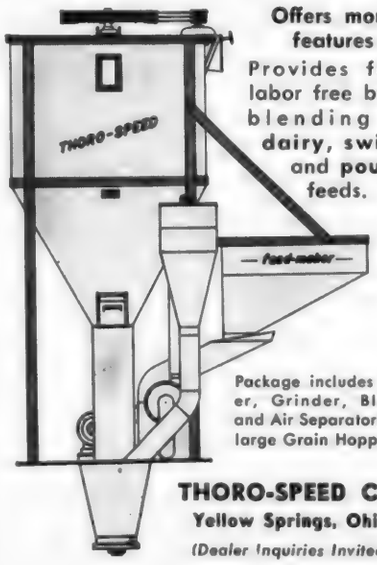

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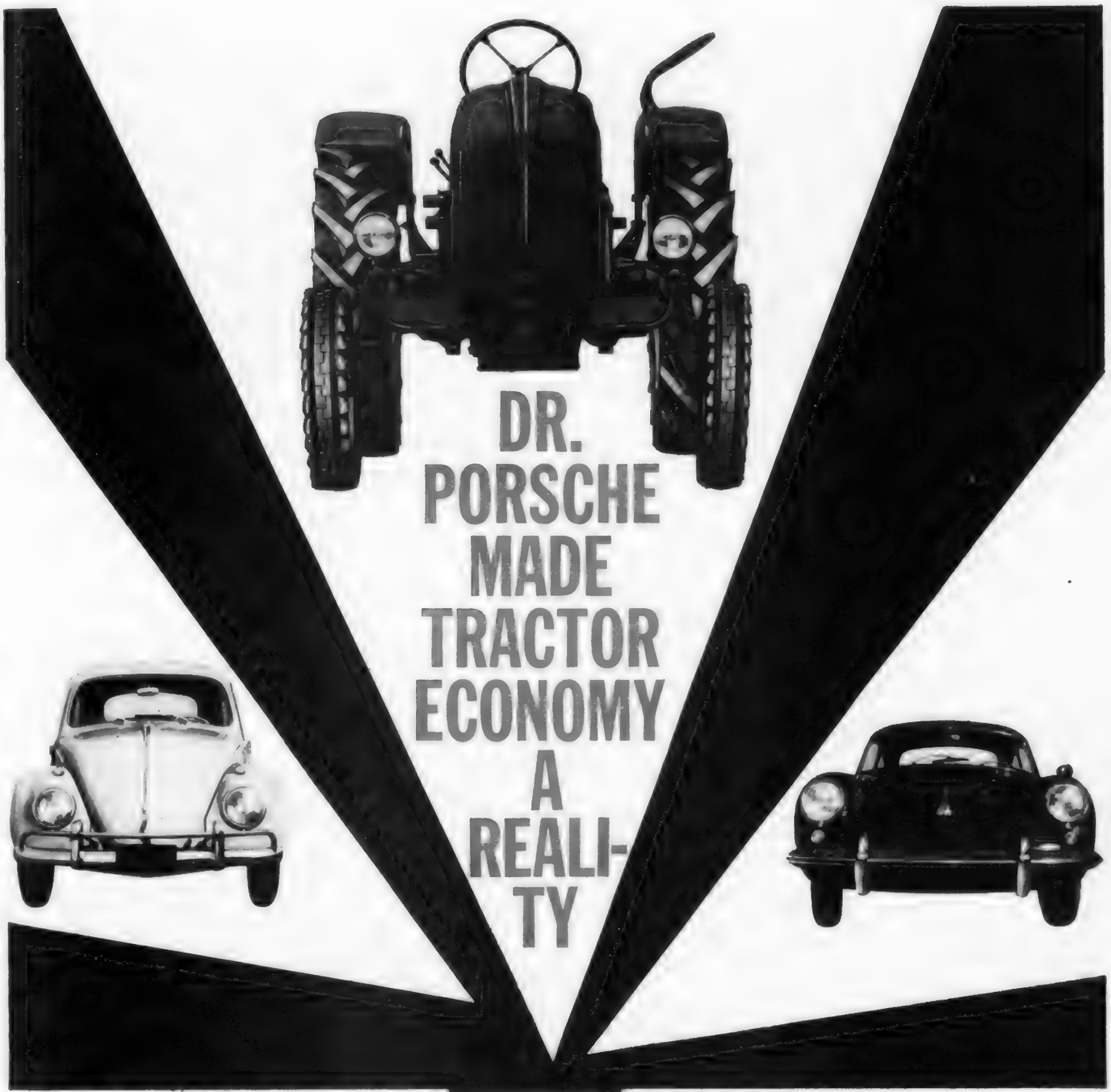

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½-inch of moisture per hour over 200-foot effective radius

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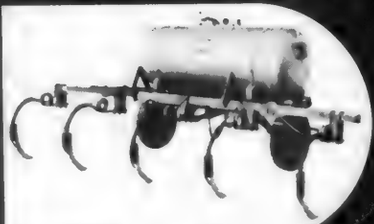

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Dependable Farm Equipment Since 1886

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SILO CARE

(*Continued from page* 76)

silos must penetrate into the capillaries in concrete. Penetrants containing substances which remain in the pores of the concrete and restore strength to the cement-sand-gravel complex and keep out water will be good for maintenance and repair. If the protection is only a coating without penetration, even if the concrete is cleaned, the coat will usually come off after one or two fillings. Penetrating materials should be laid on the concrete by brush, until the surface will not take any more, then brushed out. This is better than spraying because of better penetration and because fumes come off slowly. The fumes might be dangerous in a confined space like a silo.

In no case should a treatment be applied until after vigorous hand brushing of silo by steel brush to remove loose sand and bits of silage. The surface must always be dry.

A silo like any other equipment needs a proper schedule of inspection and repair. Given that, steel, wood, tile or concrete silos can last to be a part of your estate having paid for themselves many times over.

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NICHOLS REFRIGERATION CO.

P.O. Box 127 Medina, Ohio

PERSONALITY TEST FOR SILAGE MAKERS

(*Continued from page* 76)

Here are the answers:

If your score was 8 or more, you probably would make good silage in a horizontal silo. With a score of less than 5, beware, the quality of your silage may be bad if you are using a horizontal silo. The fact is that it takes considerably more care to make good silage in a trench. A man who enjoys and attends to details would probably do the best job with a horizontal silo. The man perfectly fitted for horizontal silos will usually answer:

1. *Yes.* This shows adaptability to different conditions, and the conditions for making good silage in a trench are quite different from those in a tower. Incidentally, to shovel either way merely means you must reverse the position of your hands, placing back the hand that is normally forward on the handle, and vice versa.

2. *No.* If you have many a cut or bruise, you may be accident prone or careless, and horizontal silage requires more care than tower silage. Records of accidents show horizontal silos are more dangerous to fill than tower silos.

3. *No.* It is cheaper and probably quicker to walk. A man who realizes this would probably also be careful in filling a trench silo and would not hurry up a job merely to finish, causing himself in the long run more expense because of poorer quality silage.

4. *Yes.* You are preparing for the future, which is exactly what you must do to make high quality silage in either kind of silo.

5. *Yes.* You are tidy. Although this is a matter of appearance, it is part of the principle that if a job is worth doing it is worth doing well. The tidy use of horizontal silos is more demanding than for vertical silos.

6. *Yes.* This detail, of course, saves money on tire wear in the long run, and if you are careful with your tires you would probably be careful with your silage.

7. *Yes.* This is part of planning. For the best use of your labor and machinery to produce good silage you must be ready to change what you do. If you are not thinking ahead, you may be too eager to fill a trench silo, cover it and forget the final quality.

8. *No.* Again a sign of a careful man, and care increases your "good fortune."

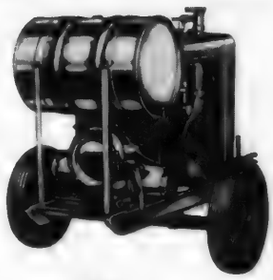
9. *Yes.* The manufacturers aren't in league with the oil companies. They know that proper care prolongs the life of your machinery and keeps it in good condition. If you give your car proper care the odds are you will be particular about the details which make for good silage.

10. *Yes.* (But we will allow you an occasional lapse here.) However, the tidier you are, probably the better silage you will make either in a trench or a tower, but particularly in a trench. There are many more "do's" in making good silage than "don'ts."

The common idea, unfortunately, is that making silage in a horizontal silo is the easy way, and once you have the crop in the trench you "have it made." The fact is that the care, intelligence and effort needed per ton of crop is far greater for making a trench effective than for a tower silo. This is not to condemn the horizontal silo, nor to say that it can't produce just as good a product as the tower. When more than 3,000 tons of silage are used in one place each year, the horizontal silo is probably more economical than towers. Silage-making in a horizontal silo needs greater attention to detail than commonly supposed, for these reasons:

A. The horizontal silo is so shallow that the weight and pressure on the silage are low. This means the trench silage will not compact itself with its own weight as will that in a tower, and will require careful filling and continued packing.

B. It takes several days for a crop to ensile. During this time the crop "dies," and the tissues lose strength and yield to compaction. If a horizontal silo is filled in 2 days, covered and forgotten, the necessary compaction is not complete. A farmer has to run a tractor or wagons, or both, over the pile for several days to make up for the compaction the tower silage automatically gets from its own weight. This means taking longer to fill the trench, and so running the loaded wagons over it more. With a very large silo, running the incoming wagons over the material already in the trench during the whole period of filling will suffice.



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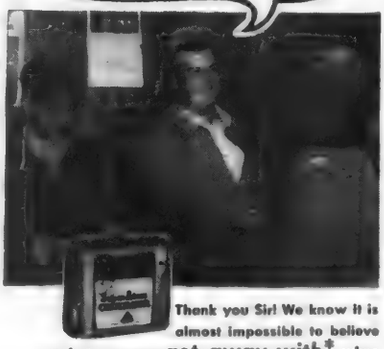

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But a new forage harvester will chop 100 tons a day, so a farmer can fill up a 200-ton silo in two days. This silo needs longer compaction than two days, and for good silage in a trench a tractor should be run over the silage for several more days.

C. The exposed area in a tower is small compared to its depth. In a trench it is large. The depth of spoilage in well made silage is the same in the tower or trench, so there is a lot more spoilage in the trench. Without proper cover this waste will cost more than the cost of a tower silo, and the power and equipment to fill that tower.

D. Normally a crop must be wilted for a tower silo, but not for a horizontal silo. To avoid juice loss in a tower silo the crop should be wilted to about 50 per cent moisture. In a trench such wilting produces more spoilage than good silage unless extreme care is taken to compact the crop. Trench silage, then, is usually wetter and this means feed from a trench silo contains far fewer nutrients per pound and the feeding program must be changed accordingly. This very moisture occupies space, has weight and gives flexibility which is vital in the trench silo, but if this silage is fed on the same basis as tower silage, the animals will be underfed.

E. Feeding from a horizontal silo takes careful timing. In most cases, an animal "grazing" directly from silage in a horizontal silo never, *never*, has good silage to eat. It slobbers on much, nibbles on some more and when it eats, loosens silage and lets air reach the material behind. Thus, the atmosphere always reaches the silage before the steer does, and this air can spoil the silage in a matter of hours. When the steer reaches the silage, it's spoiled, and the layer behind it is already spoiling. Silage, to be fresh for the animal, must be cut out and then fed. It must not be lifted or dragged out with a tractor scoop before cutting, or air gets in. Today's feed must be cut without disturbing tomorrow's.

Often a farmer has been led to use a trench silo for the convenience. The procedures above are not convenient, and yet if he has not followed them he is probably not feeding high quality silage to his animals. When these steps are followed, a trench is as good a method of producing high quality silage as a tower. If carelessness masquerades under the name of convenience and the proper procedures are not followed poor silage will result. Often the man whose attention to detail, care and planning qualify him to make good silage in a trench is the same man who does not care for the trench because of the certain amount of extra trouble, and the dirt and smell that may accompany handling silage from a trench. Nevertheless, top quality silage can be made in a trench. Don't defeat the advantages of economy of equipment and economy of investment in the trench by economy of care. The last is a false economy.

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(*Continued from page 78*)

been added to planting are strip planting, contour planting, continuous corn, wheel-track planting, and planting in sod. In the old days it was thought that no crop would do its best unless it had at least 3 cultivations. Sometimes the weather delayed the third until the corn was so tall that a single shovel plow pulled in the dust and heat by a mule was needed to complete the job. Not only was the cultivation thought necessary to eliminate weeds, but it was thought that corn gained some magic growth stimulus from having the soil stirred up around its roots. Now we are coming to believe that as long as weeds are controlled, cultivation is not necessary at all. This brings in a whole new world of sprays: pre-emergence sprays, selective sprays for both weeds and insects, and equipment to apply them.

Fertilization was once a simple matter of hauling the contents of the feedlot out to the fields in the spring, with additional organic matter provided by crop residues in the rotation. Now we are faced with a choice of dry fertilizer, pelleted fertilizer, liquid fertilizer, plowed-down fertilizer, band application, and special fertilizer applied during the growing season. This, too, takes special equipment, and if we have rich soil and are growing continuous corn—a departure from the old rotations, we may want to add a chopper to chew up the stalks so they can more readily be disked into the soil and given a shot of nitrogen to decompose them.

Harvesting in the old days was more or less a leisurely matter, quite routine and rigid in its methods all over the country. The stalks from four hills of corn were tied together in the middle of a 16-hill square. The corn, cut by hand, was stacked around the rack. Corn was cut just before the first frost, and the moisture content was of little importance since it had ample time to dry in the shock. The rains came, and the snows of winter, and when the farmer had the time he spent the day in the fields shucking out the corn and piling it beside the shock, hauling it in when he had time. The "fodder," restacked and tied up, was hauled in as roughage for the cattle. This sounds like a good deal of hard work, and it was. The hog farmer spent most of his winter outdoors getting the crop to the hogs. It once took him more than a half hour to produce a bushel—now he does it in three to six minutes.

Now we plant corn, weather permitting, on a particular date to mature at a particular time. When the corn reaches the prescribed moisture content and if the weather is kind, the picker goes into the field, the corn falls into the wagon and is dumped into a conveyor, which takes it to a crib. A good man in the old days could husk around 35 bushels during a short winter day. Today two men, one on the picker and one hauling, can harvest, dry and store 800 bushels in an eight-hour day.

A good deal of corn is being shelled as it is picked by new picker-shellers, and goes into a metal building after being put through a drying system, almost all automatic. A small boy is equipped with all the muscle power needed.

In the old slatted corncrib, air circulated freely and no one ever thought of spoiled corn, chiefly because it had dried out in the shock. Now we are faced with the relative merits of hot air and natural air, forced air and naturally circulated air, and no air at all in air-tight cribs, and sealed silos and cribs. With these we must know about the complexities of motors and fuel, and pressures, and how to operate a moisture tester.

It is in feeding that corn has shown its great versatility since it came out of the ear and began to assert itself as a component of a multitude of mixed feeds. Corn was once the easiest, simplest and most economical feed to get into livestock. Hogs, the chief consumer of corn in the old days, were penned up near the corncrib and corn was scooped to them twice a day. They chewed it off the cob, got a good ration of mud into their systems as they scrounged for the loose grains in the quagmire of the pen. The mud produced no fat, but did serve as bulk.

The conventional method of feeding corn to cattle was to haul it in out of the shock and dump it in a feedbunk, stalks and all. The cattle pulled off the ears, did their best to shell or crush them,

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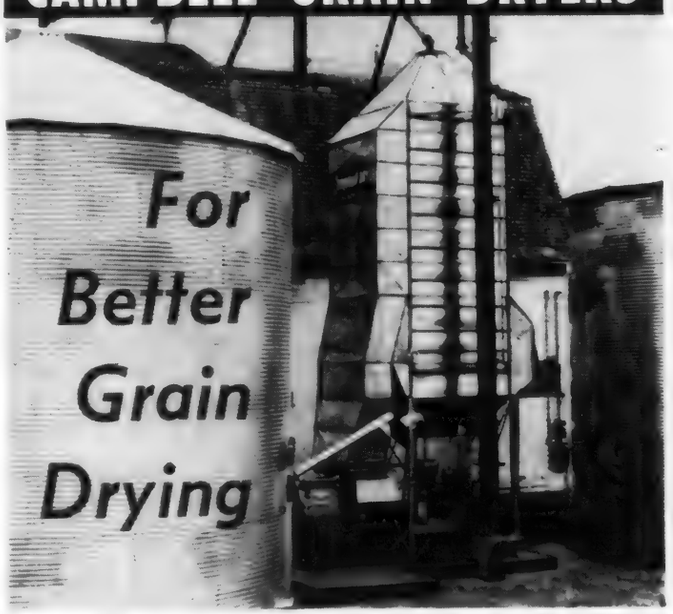

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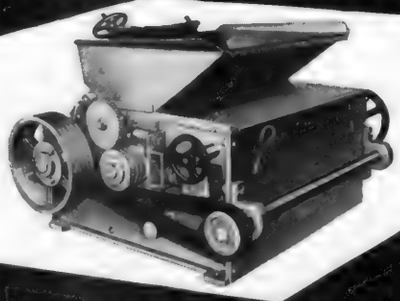

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but swallowed most of the cob whole. In the feedlots of Iowa and the corn areas of the Midwest cattle seem to have developed a special faculty for elevating their heads, rolling their eyes, and getting a twelve-inch ear of corn down their gullets without choking. A lot of the corn went through whole and undigested, and was gathered up by hogs which roamed around in the feedlot up to their bellies in mud.

The farm flock of chickens were usually given a scoop or two of loose corn out of the bottom of the crib each day, and that was about the limit and versatility of feeding corn in the old days.

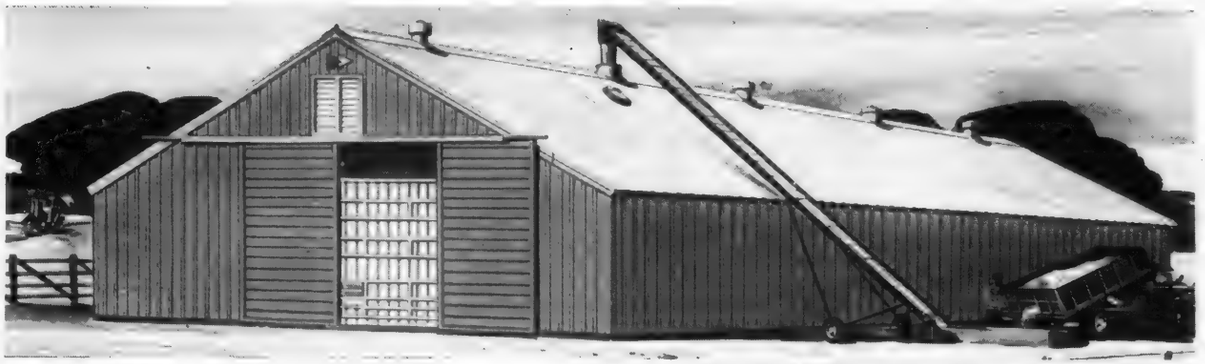
Now very little corn is fed as is. It is shelled, dried, elevated, stored and conveyed eventually to the mixer, where it becomes the chief component of a mixed feed, along with such additives as hormones, antibiotics, molasses, cottonseed cake and cottonseed hulls, and perhaps urea, and other fancy synthetic protein supplements. Disposal of cobs in the old days was usually through the kitchen stove or a huge and ever-burning bonfire beside the country elevator. Now that we know the feed value of cobs, greater use is being made of them in feeds and industry.

In the matter of silage, which was once chopped-up corn dumped into a silo and shoveled out by a scoop, corn has again shown its versatility. The development of the sealed silo, a wider variation of kinds and conditions of silage, and the storage of wet corn, silage preservatives and additives such as molasses, has also complicated a once-simple operation. In recent years both vertical and horizontal silos have reached a high degree of efficiency. Silage making, because of wide difference of moisture and harvesting conditions, has not yet been reduced to a standard formula, and still depends much on the eye of the farmer.

No one was able to get silage out of a silo without work until silo unloaders, both the in-silo type and the auger-type, came on the market some years ago.

In the good old days when the maple syrup and the brown sugar syrup palled on the palate of the farmer, he could buy a can of corn syrup, his cheapest source of sugar, at the crossroads grocery. The manufacturer of corn syrup and a small use of corncobs for pipes was about the extent of the chemurgic use of corn a couple of generations ago. However, once the chemists got an ear of corn in the laboratory they performed minor miracles with it, and today we have before us a multitude of foodstuffs—dextrose, cellulose, corn germ, corn flakes, as well as hush puppies, scones and plain old-fashioned cornbread. Corn is now important in the production of plastics, and paper is being made from corn.

Altogether corn has come a long way since the Indians presented Christopher Columbus with a few nubbins as the most precious gift of the New World to the Old. Today, as it always has been, it is the chief money crop of the farmer who can do more



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CHOLERA AND CARELESSNESS

(*Continued from page* 68)

"I figured there wouldn't be too much money in the hog business and this would be a good place to cut corners. Turned out it wasn't. Cholera broke in a lot of 92 hogs weighing around 150 pounds. The only thing I noticed was they cut down on the feed. Then I saw a few in the yard that weren't so spry. I thought I'd wait a couple o'days to see if I got any more, so by the time I got the vet out the whole lot was pretty sick. That was four or five days after I noticed they were off feed. We vaccinated, but three or four days later I started losing hogs. I didn't ship any. They kept on dying for a month, more early than late, but it never spread to any other of my hogs. All my sows and boars had been vaccinated earlier. I lost fifty or so. To me that was the quickest I ever saw anything hit."

Johnson, a friendly man, proud of his 160 acres and his hog operation, lost money and time—for his breeding gilts were in the batch that "broke" with cholera.

Johnson's veterinarian, Dr. H. L. Marsh, of Princeton, Illinois, said, "I have a theory that we have a whole generation of young farmers who have read so much about erysipelas, TGE, leptospirosis, and other 'new' hog diseases that they have forgotten hog cholera still kills more hogs than any one of the others.

"We had a bad outbreak around here. You hear there are new strains of the virus that break through the vaccine, but I'm not sure there has been a lot of trouble with vaccines. Anyway, I'm sure the outbreaks this summer around here were 90 per cent due to lack of vaccination. It's a funny thing," Dr. Marsh said, "the owner who doesn't vaccinate and starts losing hogs has a little guilt complex, and tries to believe in his own mind it could be anything but cholera. He is reluctant to have it called cholera, and reluctant to use the treatment for cholera. His slowness here helps the spread of the disease.

"But cholera is a difficult disease to identify. Probably every practitioner in the swine belt would agree he occasionally finds he is facing hog cholera when all the other treatments have failed. 'Typical' hog cholera is a misnomer. There are often no typical signs. That is the reason for getting a complete history from a farmer where you suspect cholera may have broken out in his herd. I usually settle first whether he has vaccinated, then get a complete history of weight for age, ration, movements, new hogs in the herd, as well as clinical tests like temperature and appearance. Then I like to autopsy a hog, a normal sized one, not a runt.

"You don't autopsy the runt hog, the skunk pig, which economically you would like to do for the farmer. That pig may be small because of some previous condition that probably bears no relation to the present state of the herd. You must pick a pig showing symptoms typical of the herd.

"The autopsy doesn't take long—a 40-pound shoat could be done in ten or fifteen minutes, a 400-pound sow in perhaps half an hour. The autopsy can show many indications of hog cholera. Some of the common ones are small red spots on the kidneys, bleeding on the lungs, bladder, and even

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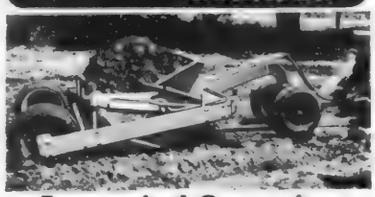

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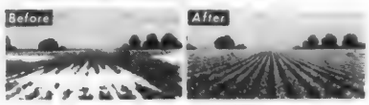

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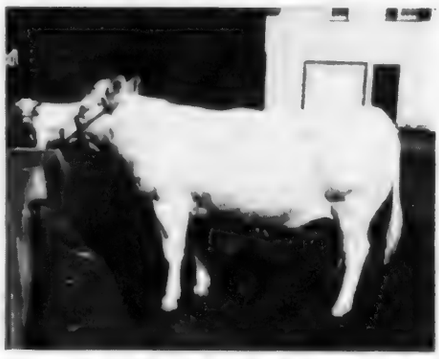

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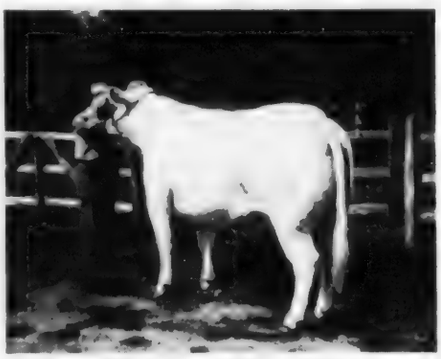

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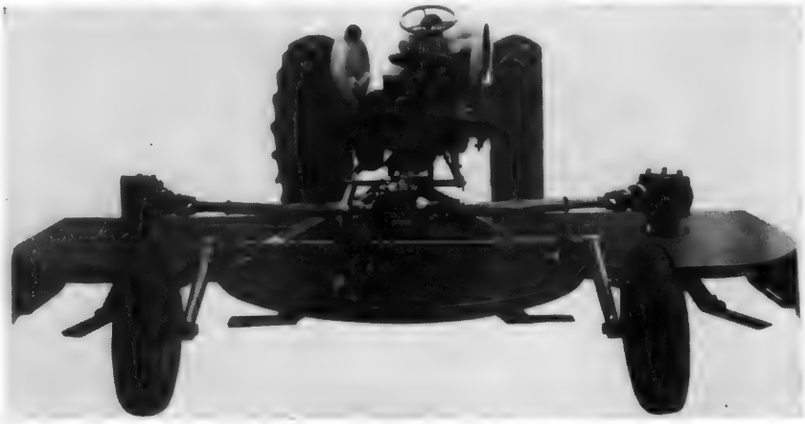

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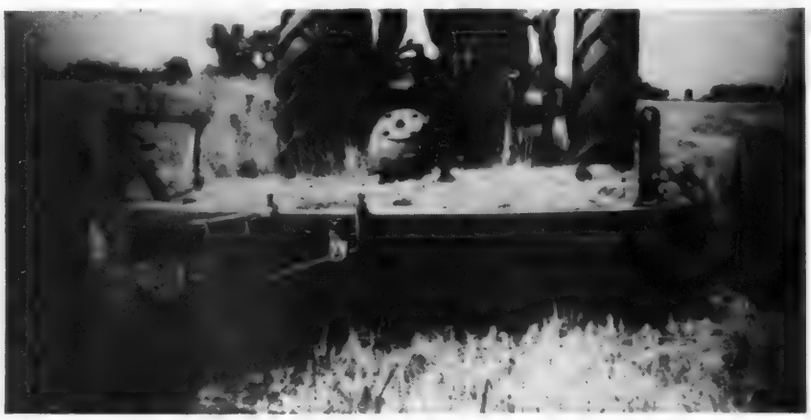

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- ☐ Soil Scraper
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the intestines and heart. There may be small 'button' ulcers on the large intestine, and one common finding, shown in a blood test, is a decreased number of white blood cells. A majority of cholera-sick hogs have an inflammation of the brain and some anemia. In pure hog cholera, lesions may be few and hard to find, while in complicated cases they are many and quite large. Also lesions vary because of the susceptibility of the pigs, the strain or source of the virus, the method of infection, time of year and the conditions under which the sick animals were kept. The lymph nodes are the first tissues to show microscopic pathological changes and are the most constant in the development of lesions.

"I suppose no autopsy is absolutely final," continued Dr. Marsh, "and particularly so with hog cholera. The virus of cholera behaves like that of the common cold. I don't think a cold ever killed anybody, but it can allow a strep throat to invade a system normally protected against this. The strep throat could be serious. So it is with cholera. The cholera virus lowers resistance and secondary bacterial invaders attack the hog and cause lesions which seem to be characteristic of cholera. In fact these bacteria were at one time thought to be the true cause of the disease, until the virus was identified in 1903. However, hog cholera virus is a killer in all swine, healthy or otherwise. Secondary infections cloud the diagnosis, making it difficult and time consuming."

The Signs of Cholera

The disease seems to hit one or two hogs first. They look sick all over—back hunched up, tail straight, head down. They lose their appetite, stay in the shed, burrow in the bedding, and when they move they stagger. The eyelids may be gummed together. One of the characteristics is a wobbly walk with the back legs, collapsing when they lie down.

The hog is sick 4 to 21 days before death (even longer in some cases), and very few hogs recover. All ages are affected unless they are immunized animals.

What To Do

The thing to do is to vaccinate regularly and prevent cholera. But if you haven't, immediately hog cholera is suspected, call a veterinarian. As soon as he has diagnosed the disease he will immunize—using either serum and vaccine or serum alone. (Serum

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protects for only a few weeks, some claim as little as 14 days, and is usually used only on stock to be slaughtered).

If cholera is confirmed, no hogs should be moved from the farm without a permit.

Neighbors should be told (use the phone —don't visit other farms where hogs are kept) and keep visitors away from your farm if possible, and certainly away from your hog lot.

Remove dead animals fast. Burn them, or bury them deep, with quicklime. They can be sold for rendering under strict standards of cleanliness, leaving in sealed trucks, disinfected afterward. Disinfect all tools, vehicles, clothes, buildings, machinery and utensils that have touched dead or sick animals. A veterinarian should outline steps for disinfecting the hog barn.

All outbreaks should be reported to the state livestock sanitary authority.

Causes of Cholera

Although cholera is nearly always due to infection from a hog, or part of a hog, that has the disease, there are records of "natural" outbreaks. Only recently has it been shown that lungworms have a hand in this —as they can carry the hog cholera virus through their life cycle. The lungworm eggs pass out in the feces, carrying the virus of cholera. The virus remains with the lungworm egg through its stay in the soil and later in the earthworm, if the egg is eaten by the earthworm, another host of the hog lungworm. The virus returns to the hog with the lungworm when the hog eats an infected earthworm.

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The virus which reaches the hog thus is masked or quiet—and this quiet virus will not produce hog cholera. But the virus will multiply, and then may be triggered into the fully active and fatal form of cholera when the hog is weakened by shock, poor feeding, traveling, cold, vaccination, or some similar stress. Other animals may also carry the virus. Japanese workers have shown the virus can be passed through goats and recovered in a virulent form. This was experimental, and no naturally occurring case of this kind has been reported. There is also an occasional hog that will carry the disease, yet show no symptoms.

The only consolation is that scientists believe "natural" outbreaks are rare, and that the virus will live in the earthworm for only about two years.

Control

If the natural outbreaks were anything but rare, control of cholera would be next to impossible. But cholera all too frequently follows patterns of management we can control.

The outbreaks are usually in unvaccinated hogs, in a district where cholera is already active. Hogs may have been bought recently, and there is sickness without any obvious cause. The disease affects all ages, and some vaccinated hogs nearby remain well.

One of the deceiving signs is the six to 15 days exposure before a hog is visibly sick.

There is one sure, safe, or as-certain-as-we-can-ever-be control and that is vaccination.

Vaccination of 65 or 70 per cent of the hogs in an area will prevent any rampage of the disease through hogs in that district. Estimates from veterinarians put the figure for vaccinated hogs as low as 30 to 35 per cent in the areas caught by cholera in the fall of 1959.

Eradication

Vaccination reduces the number of hogs that can take cholera (and pass it on) and so in effect reduces the population of hogs as far as cholera is concerned.

Eradication is simple in theory. First, every hog is vaccinated, then all outbreaks are reported, and all steps taken to limit outbreaks to the farms where they occur. This is often done by slaughter and burial or other disposal on the farm.

Canada and the United Kingdom have made hog cholera (the British call it swine fever) a reportable disease, have slaughtered every pig in a herd that becomes affected, and have saved millions of dollars by so doing. They have controlled the disease so effectively it now is a minor problem economically.

Competent veterinarians believe this can be done in the United States. The first step is to determine the exact incidence of the disease by adequate reporting of outbreaks. The next step is to ban distribution, sale and use of the live, fully virulent virus. The next step is to enforce rigorously restrictions on movement of cholera-sick hogs, and disinfect adequately after an outbreak.

The use of raw garbage is a fast means of spreading hog cholera, because the uncooked garbage may contain raw pork cuttings, which can easily carry the virus. All garbage to be fed must be cooked.

To know where the cholera is lurking, it is essential the disease be made reportable in every state. Legal penalties may help, but the real enforcement of reporting cholera depends on hogmen—and their veterinarians.

The final and essential precaution is vaccination, using the modified live virus. No hog should be sold, shown at fairs, or placed in an auction ring without a certificate of vaccination. The vaccination should be long enough before the sale to allow full immunity to develop. The very act of vaccinating a majority of the hogs will markedly reduce outbreaks of cholera—and individuals are safe. Don't gamble with this disease, as you can't stop it once it reaches your hog lot.

Hog cholera could be eradicated. As long as it is free to roam, unchecked and often unreported, it will continue to cost the American hogmen in the region of fifty million dollars a year. This is a lot to pay for delay.

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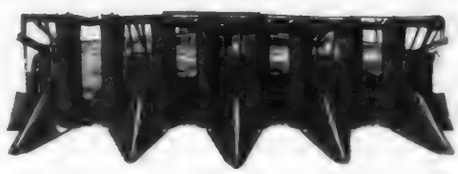


HESSTON CORN HARVESTER ATTACHES TO YOUR COMBINE PLATFORM

HESSTON CORN HARVESTER

lets you cut, shell, shred, and spread in one operation!

During 1959, hundreds of progressive farmers **combined their corn** with efficient, low-cost Hesston Corn Harvesters on their combines!

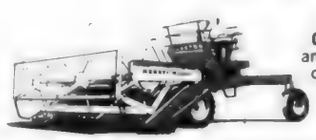
Hesston lets you harvest one, two, three, or four rows at a time; shell the corn, shred and spread stalks, leaves and cobs evenly over your field. Your field is ready to plow right behind the combine! Vertical drums with retractable fingers gather stalks for fast, safe delivery into the platform. Grain is shelled **inside** the combine . . . no dangerous grain-wasting snapper rolls!

Equally efficient in corn, soybeans, milo-maize, millet, and similar row crops, Hesston lets you go from field to field without changing headers! Adjustable for 33″ to 42″ rows. Installation is simple and requires no special tools.

Hesston sells for about ⅓ the price of other corn headers because it utilizes your present combine platform. Built to high-quality standards for superior field performance.

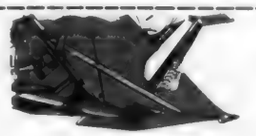
Send for free, colorful brochure with testimonials and name of your nearest dealer.

OTHER HESSTON PRODUCTS PUT YOU AHEAD IN THE FIELD



HESSTON 220 WINDROWER CONDITIONER Cut, condition, and windrow hay in one efficient operation! Also for small grain, mint, seed crops, peas, and a wide variety of other crops. 10′, 12′, 14′, and 16′ headers.

HESSTON PULL-TYPE HAY CONDITIONER "Tenderizes" hay with same efficient action as Windrower-Conditioner. Belt drive, big wheels, heavy-duty construction.



HESSTON SOYBEAN ATTACHMENT Eliminates loss from pod cutting and shattered beans. Increases soybean yield up to four bushels per acre!

HESSTON Manufacturing Company, Inc.
495 KING STREET · HESSTON, KANSAS

Please send me literature and name of my distributor on the Hesston Corn Harvester_____ Windrower_____ Soybean Attachment_____ Hay Conditioner_____.
I am a farmer_____ dealer_____ student_____.

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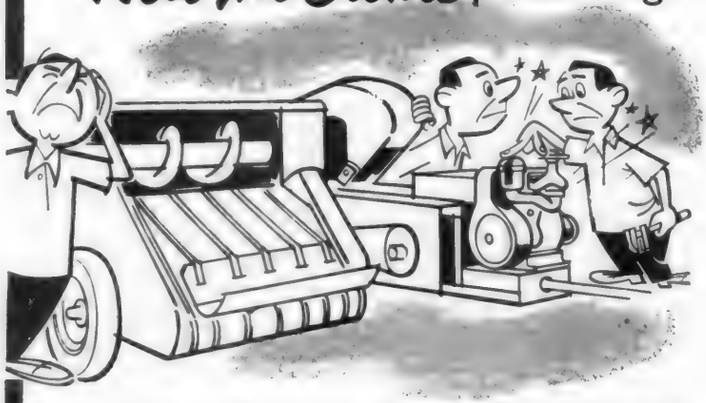
TOWN_____ STATE_____

CH4-160

RE-POWER your service-worn WISCONSIN ENGINES with New TriCrome® piston rings...



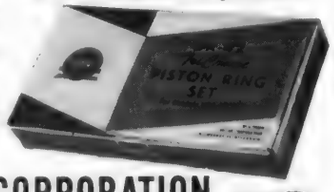
Think about this: A re-ring job *now* may save you the expense and time-loss of a costly re-boring job later on!

Any engine that has gone through several seasons of hard service is a likely candidate for new piston rings . . . for good-as-new re-powering . . . depending on *the kind of rings* used. There's nothing better for Wisconsin Engines than factory-engineered TRICROME Rings . . . with *3 full-chrome rings to a re-ring set* instead of only 1 or 2 (as supplied by others.)

WISCONSIN TRICROME rings are pre-seated for light-tight fit which is the best power seal you can get. Full chrome plating protects rings and cylinder walls against scuffing, abrasion and scoring . . . *regardless of service!* Every TriCrome set includes a chrome-faced oil ring for full compression and *oil control along the entire piston travel.*

And while you are about it . . . get a complete engine check-up and full servicing (if needed). For uniform quality throughout, *insist* on Wisconsin factory-engineered parts . . . obtainable by your local dealer from any of our more than 2,000 Wisconsin Authorized Service Stations who carry parts for all Wisconsin Engine models.

For your records, and for proper engine servicing if and when needed, write for the name of our nearest factory-approved service station. Address: Dept. F-60.



WISCONSIN MOTOR CORPORATION
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

A-108

Graze livestock nearly all Winter on

RUSSIAN WILD RYE GRASS

Never known to winter kill—*even in Canada!*

New miracle grass from Siberia stays green and palatable right into winter. Extra hardy, long-life perennial. Stands heavy grazing. Resists severe cold and drouth, yet grows fast and tender in warm weather.

Holds more protein and Vitamin A during winter than any other grass. Blade samples in June showed 18.4% protein, samples taken in February showed 11.5% protein. Retains high Vitamin A all winter also. Grows early in Spring, averages 3 inches ahead of crested wheat grass.

Get this vigorous No. 1 quality Canadian seed. Hardiest strain known. High purity, high test seed in original vermin-proof bags. Sow 5 lbs. per acre in Spring. Grows best in northern half of U.S. and high plains areas. Order now. Supply limited, offered only while shipment lasts. Price $1.25 per lb. Free Bulletin and planting information. Minimum order 50 lbs. for $62.50.

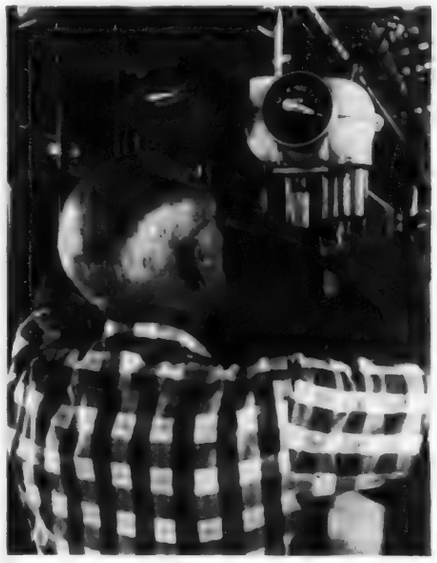
John Ewing COMPANY
P. O. BOX 628 LA SALLE, COLORADO

THREE-ACRE DAIRY

(*Continued from page* 96)

so they were receiving 80 cents a hundred over the Grade A price, or $5.47 for their milk. They keep within their base, and have sold little milk at the Grade II price of $3.33 a hundred. The milk is picked up daily from the bulk tank.

Weaver's veterinary costs are low, as they do much of the routine veterinary work themselves. T.B. and Bangs testing is one of the major costs, and Weaver estimates that services and supplies cost him around $50 a month. Artificial insemination costs $7.50 per cow, with two free returns. The dairy breeds all its own replacements.



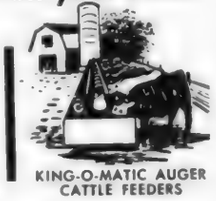
R. F. Williams is DHIA tester for the Weaver Dairy. He has been testing for 30 years, tows his little housetrailer around to each dairy.

Would the idea work anywhere? "The *idea* would," said Bill Weaver, "but the confinement of cattle in a high-humidity climate would multiply troubles a hundredfold. Here the Lord's on our side almost every day with the sunshine killing germs. We have very little rain. I don't have as many herd problems as I had in Indiana with a much smaller herd."

Weaver feels they have come close to the size limit with their unit. "Because of an eight-hour day, and the labor involved, with our tandem three-stall stanchion barn we are very near capacity," said Weaver. "I think it would be better to duplicate this unit and use two milk crews than to expand this one. We could possibly go to 225 or 240.

Parker Automated Feeding Can increase profits on your farm!

GLASS-LINED PUSH-BUTTON HOG FEEDERS



KING-O-MATIC AUGER CATTLE FEEDERS

Send for complete illustrated brochure or call Silver Lake, Indiana 3281

PARKER FEEDERS, INC. SILVER LAKE, IND. BOX 1003

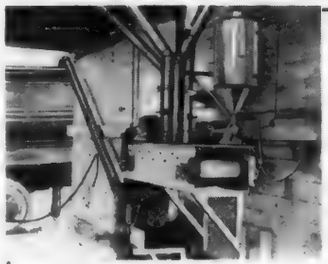
"We have tried working two men at milking, but in that small alleyway, it positively does not work. The timing is most important. If I were doing it again I'd install a herringbone parlor. I think it's the 1975 model," grinned Weaver. "A man saves about eight feet walking per cow, and we feel he could handle four cows a side instead of three." The Weavers plan to build a second dairy during the next five years.

Dave was talking of three times a day milking, which would keep the dairy open 24 hours a day. "We only have to increase milk production 10 per cent," Dave explained, "to pay the costs. I think maybe this summer we will go to three times a day, when we've got the least number of cows milking, and can get it running smoothly with the least work. I believe it'll give the cows a *longer* working life," said Dave. "More frequent milking will help their udder, especially when they are tight, early in lactation."

Others

The whole dairy depends on other people to exist. Other farmers sell them feed, both roughage and concentrate. It is delivered by other people's trucks. Others buy, and collect, the milk, and pipe in the water (it costs $25 a month) and electricity ($75 a month). Another man moves the manure and provides the land. But the Weavers are little concerned by this dependence. They don't believe silage or hay will ever be unavailable or overpriced; their contracts are set up well in advance. Far more likely, the father believes, is that Phoenix, fastest-growing city in the United States, will sprawl across the desert to engulf them before their contract expires. They are possibly three miles from suburbia now.

If they were forced to move, the simplicity of their fixed equipment would help. The tank and pipeline would not be difficult to move, and some of the fences and pens would carry to a new spot. Their biggest fixed cost is the easiest to move. The cows can walk.



CUT FEED COSTS

Grain Master Mill and Blender grinds and mixes feed rations automatically. It will save labor and cut feed costs $10 to $15 per ton below bulk feeds. Ideally suited for cattle, hog and poultry feeding. Grains and supplements are proportioned accurately, with medical attachment available. Timer can be set up to 2 hours, with automatic shutoff. Blender sold separately to fit any grinder. Write for literature and prices.

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IT CHOPS, CLIPS, MULCHES, SHREDS!

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This flail type harvester with recutter knives does so many tough jobs so easily and well — costs so little to own and operate, that no feed and forage handling system is complete without a Papec No. 60 Utility Harvester.

Your No. 60 will be ideal for direct cutting of either green feed or silage — for shredding and spreading corn and other stalks for pest control and easier plowing — for harvesting cornstalks and straw for bedding — for clipping your pastures — and for a variety of similar jobs.

It's a big capacity machine with a full five-foot cutting width. Cutting height is adjustable from 2½ to 6 inches. Hardened alloy steel rotor blades feed directly to auger. Blower wheel carries 3 hardened alloy steel knives (for finer cut, three more can be added). Blower throat has two reversible shear plates with precision ground edges. Rotor is dynamically balanced. Removable wheel cover makes knives easily accessible. Auger cover locks open for pasture clipping, stalk shredding and similar jobs.

See the Papec No. 60 Utility Harvester at your Papec Dealer or send the coupon below for complete information about this or other Papec units.

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FEED and FORAGE EQUIPMENT for LIVESTOCK and DAIRY FARMING

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Please send me complete information about the Papec Units checked below:

- ☐ Utility Harvesters
- ☐ Forage Harvesters
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HEALTHIER PROFITS OUT OF A RED AND GREEN BAG!

Here's how AUREOMYCIN Crumbles produces more product for market . . . no matter what combination of livestock you raise.

AUREOMYCIN® Crumbles mean improved health . . . healthier profits in any livestock operation —large, small or in-between.

University and experiment station tests plus the experience of thousands of livestock men prove that the use of AUREOMYCIN Crumbles is an important factor in good livestock management.

Here's why: Normal animals on AUREOMYCIN Crumbles reach a higher potential through better health. They look better, feel better, do better.

That's because animals have hidden diseases — bacterial burdens which scientists call subclinical infections. These hidden diseases slow growth, sap strength and vigor, help make tail enders in the feed lot, hog pen or milking line. Under stress conditions they can flare up, causing serious setbacks and losses. Stress and hidden disease may account for outbreaks of shipping fever, foot rot, scours and many other livestock diseases.

Hidden diseases, as well as disease flare-ups, hold an animal back, cause failure to make profitable weight gains or to reach maximum capacity in the milking line.

AUREOMYCIN Crumbles help keep these hidden diseases in check—in beef cattle, sheep, hogs and dairy cows.

Healthier Profits for Beef Cattlemen

AUREOMYCIN Crumbles help control bacterial diarrhea (scours), foot rot, liver abscesses, respiratory infections (shipping fever complex) and anaplasmosis in beef cattle.

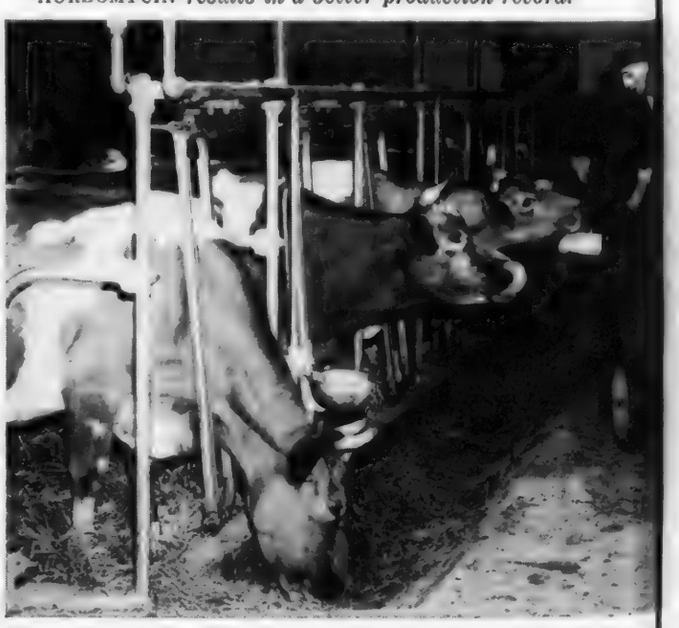
Weight gains are improved; feed efficiency is increased. You get better "bloom," finer carcass quality...the kind buyers prefer!

Healthier Profits for Sheepmen

AUREOMYCIN Crumbles help get lambs on full feed faster. Changeover time, special mixes and hand feeding can be cut down. There is less scouring and less enterotoxemia. Respiratory infections are reduced, off-feed days are cut down and there will be fewer tailenders. Your animals "perk up," show a brighter eye, improved fleece and better finish.

In a recent trial in Iowa, a pig herd was divided into two lots at weaning. The lot fed AUREOMYCIN gained 15 per cent more per day than the lot not receiving the antibiotic—at a saving of 36 pounds of feed per 100 pounds of weight gain.

Dairymen using AUREOMYCIN Crumbles find that AUREOMYCIN will not replace good herd management . . . nor will they "make more milk." They have found, however, that the better herd health achieved with AUREOMYCIN results in a better production record.



In one trial on four lots of sheep there were 42 deaths from enterotoxemia in the lots not receiving—or taken off the antibiotic. In the two lots receiving AUREOMYCIN, and kept on it, there were no deaths.

Healthier Profits for Hog Raisers

Hog raisers find that AUREOMYCIN Crumbles help control bacterial scours (enteritis – necrotic enteritis–vibrio dysentery – baby pig bacterial diarrhea) and cervical abscesses. They help maintain weight gains in herds with atrophic rhinitis and increase weight gains and feed efficiency. Feeder pigs may look well – but never reach full growth potential. AUREOMYCIN Crumbles help you get the most out of *any* swine herd.

Healthier Profits for Dairymen

AUREOMYCIN Crumbles give the dairyman these invaluable advantages – they help maintain high herd health, check bacterial scours, control foot rot, reduce losses from respiratory infections (pneumonia, infectious rhinotracheitis, shipping fever complex) and increase growth rate and feed efficiency in calves.

AUREOMYCIN won't "make more milk"—but it will result in a healthier herd better able to reach its maximum bred-in capacity.

In another recent trial a lot of 600-pound feeder cattle was divided into two groups. At the end of 90 days the group receiving AUREOMYCIN averaged 13 per cent higher daily weight gains—on 12 per cent less feed per pound of gain.

Easy to Use

One product—AUREOMYCIN Crumbles – gives you all these profit-making advantages, no matter what combination of livestock you raise. You don't need several *different* products—one does the job! Use AUREOMYCIN Crumbles, according to directions, with any kind of ration, with your beef cattle, sheep, swine or dairy stock – and get *healthier profits!* American Cyanamid Company, Agricultural Division, New York 20, New York. ®*AUREOMYCIN is American Cyanamid Company's trademark for chlortetracycline.*

AUREOMYCIN Crumbles, furnished in 50-lb. bags are available from your veterinarian, druggist or feed dealer. If you would like to "see for yourself" ask your regular supplier for a free trial sample.

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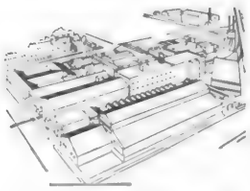
AUREOMYCIN
CRUMBLES

CYANAMID SERVES THE MAN WHO MAKES A BUSINESS OF AGRICULTURE

Pump Talk by Deming

DEMING COMPANY CELEBRATES 80th ANNIVERSARY



The Deming Company Starts its 80th year of progress with experience. Well known in the pump and water system field, the Deming Company has contributed greatly to expanding industry and farming. Farm living is easier, more comfortable with Deming Water Systems. There's one to meet any size, any requirement.

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The Deming Company recently announced the availability of their new Submersible Pump. This new series means lower price, deeper settings and more water.

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Write today for the informative booklet, "How to Select Your Water System".

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ADDRESS_____

CITY_____ ZONE____ STATE_____

The DEMING Co.
314 Broadway • Salem, Ohio

FEED MAKES THE COW

(*Continued from page* 103)

treated by top-flight people from the College of Veterinary Medicine. They were then bred again—some as many as twelve times before they were culled. Our point was to keep the experiment going; and we know that we can go back through our records, figure the actual economic point at which we should have culled these animals, and adjust the records to show what a good, sound farm policy would have produced in this regard."

The actual culling record was:

Number of Animals Discarded for Various Reasons

	Low	Medium	High
No. Allotted Initially	34	34	34
Sterility	0	3	6
Mastitis	4	10	10
Milk Fever	3	0	0
Died or Slaughtered*	5	3	1
Total Number Lost	12	16	17

* Rabies, hardware disease, blackleg and unknown causes.

"A curious coincidence connected with the culling," Dr. Reid continued, "is that most of the animals culled from the low-level group were among the highest producers and most of those culled from the high-level group were low in production for their group. If these animals had remained in the herd, the differences in milk production between the groups probably would have been accentuated."

Longevity

Since the oldest animals in the Cornell experiment are now but 12 years old, it is too early to draw any conclusions from this test as to longevity. Dr. Reid, however, points out that one-half the high-level animals, and almost one-half of the medium, have already been culled or died. He also notes that in every experiment in which an animal's early growth rate was slowed and sexual maturity delayed because of low levels of feeding in the pre-puberty stage, the animal's life has been prolonged when compared to normally fed controls. Such experiments have been conducted on cows in the Scandinavian countries, and on rats, mice, water fleas, protozoa, fruit flies, and silk worms. It is probably a safe conclusion that the same thing will be found here.

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Translucent Hailproof Fiberglass Building Panels

Translucent FILON for skylighting, sidelighting and glazing admits up to 85% of natural light. Diffuses light evenly for easy-eye comfort. No shadow or glare. Shatterproof, weatherproof. Never needs replacement; needs no painting. Saves you countless dollars on light bills.

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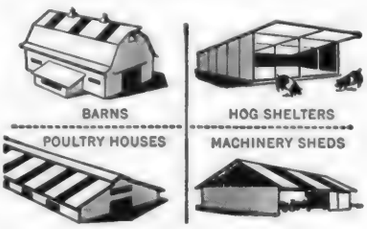

Easy To Install—nests perfectly with all roofing and siding materials; up quick at low cost with ordinary tools. Buy FILON at lumber, building materials or glass dealers. Available in 2½" and 1¼" Corrugations, Flat, 5V Crimp and other configurations; also pre-cut shatterproof glazing panes.

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"FILON For The Farm" Facts, photos and ideas; details, types, sizes. Write today: FILON PLASTICS CORPORATION, Agricultural Services Dept. 333 N. Van Ness Avenue, Hawthorne 41, California. Also available from your Filon distributor or dealer.

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What Choices for the Dairy Man

Scientists are reluctant to make recommendations to dairymen from such findings as these. For one thing, the numbers seem too small to make careful statistical analysis. Nevertheless, the findings at Cornell are supported by the Scandinavian and the Tennessee experiments. It seems safe to conclude that heavily-fed animals will mature more rapidly and give less milk than lightly-fed heifers. One may also safely infer that the lightly-fed heifers will outlive the heavily-fed animals. It is probable, though not proved conclusively, that the lightly-fed heifers will have more trouble at first calving and that heavily-fed may have more sterility problems in later life.

In using these facts, a dairyman should know one other thing. Daughters of experimental cows were put back into the experiment on the same feed plan as their dams to see if their results would accentuate those found with their mothers. In no case did the daughter's results seem to magnify those of her dam; they simply fell into the same pattern.

If a dairyman were very anxious to increase the size of his herd, he might feed very heavily to gain a lactation with his heifers. He would probably suffer for this later in their milk production.

If he were after the cheapest possible method of raising his replacements, he might want to go to lighter than recommended feeding. Though Cornell used 60 per cent of normal in their experiment, there is nothing magic in this number. A 75 per cent of normal feed would probably be a better figure for the practical dairyman. This feeding level could be easily accomplished by feeding good forage without any concentrates from about six months of age on to first calving. He would pay for this in slower maturity. He might even be able to overcome this defect by flushing the heifers with a couple of pounds of grain a day for a couple of weeks when they reach normal breeding age. Dr. Reid feels that such a flushing would have brought most of the low-level heifers into heat at 18 months on the Cornell experiment.

Whichever road he takes in raising the heifers, the dairyman must remember one thing: when they come into production, they have to have good feed and plenty of it.

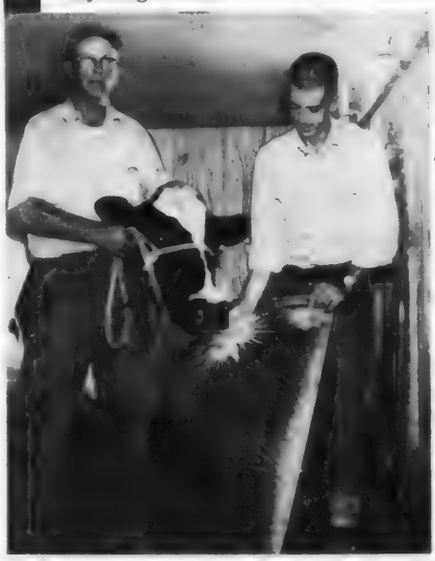
LICKITY LOG SPLITTER

•Hydraulic power splits profits from waste wood • 7 HP trailer model • two speed • auto shift • auto stroke. Power "squats" to receive large diameter logs without "dead" lift—eighteen ton smooth hydraulic force cuts right through knots, 26" stroke handles up to 30" length, any diameter. Your name on a postal card will bring literature.

THE WACO AIRCRAFT CO., Dept. C, Troy, Ohio

Q: WHY DID YOU ORDER A 2ND BUCKEYE GRASS INCUBATOR?
A: FIRST ONE MADE US A 25% INCREASE IN PRODUCTION!

These are the actual words of E. O. Lambert, Jr. and D. F. Sells, owners of Circle D & E Farms, Malta, Ohio. They go on to say, "We know it is the real answer to insure more even milk production, higher production and at the same time cut feed costs with a healthier herd. Our D.H.I.A. records show the first Buckeye Incubator made a 25% increase in production. If our second Grass Incubator proves as helpful as the first, we couldn't ask for anything better."



Another dairyman, James Bagwell of Alpharetta, Ga. says, "After we started feeding the grass, we began having an increase from 180-185 to over 200 gallons a day and I feel that this is remarkable because we have had terrible weather, either freezing, raining, or both when we could have expected to lose a lot in production. I told you that I wanted to buy another and it is a great pleasure to tell you that I am now in a position to make that purchase. Please enter my order for another 120 tray unit."

The Buckeye distributor in your area will be glad to give you the facts. Call him or write us for more information today.

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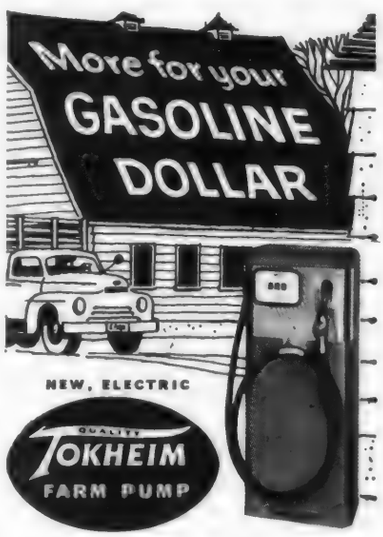

You get more for your money with an electric Tokheim Gasoline Pump. Gasoline deteriorates less when stored underground where it's cooler. It evaporates less too. Moreover with a Tokheim there's no pilferage, no spilling, no waste! Less fire risk! Easy-to-read dial. Plenty of hose. Ask your oil man or Tokheim representative. Write today for *free* booklet, "How to Install Underground Tanks".

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with these NEW KELLY DUPLEX machines

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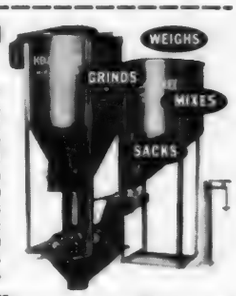
The same "Mix 'n Grind" machine described above—with a hopper bin and scale added. The hopper bin is entirely supported on the scale—so that you can accurately weigh material before it is ground. Available in 1, 1½ and 2 ton models with 1200, 1800 and 2400 lb. capacity bins respectively.



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Silo filling is a one-man job with the Cobey 51-BF.

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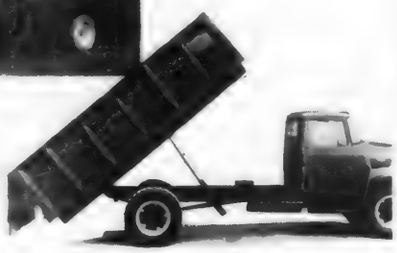
The Cobey 51-B is a straight self-unloading Forage Wagon.

ONE MAN CAN UNLOAD IN MINUTES WHAT 3 MEN WOULD TAKE HOURS TO SCOOP!



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Here's the Cobey P-T-O 200-Bushel Spreader doing double-duty as a self-unloading Forage Wagon!

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THE COBEY CORPORATION, Galion, Ohio

TWO OR MORE SILOS

(*Continued from page* 101)

big, fat doubts because most farmers have not yet come to that degree of experience in feed production and utilization.

Filling in such a continuous process makes the filling of the silo an extremely expensive proposition. You need a lot of equipment, either by ownership or hire, for a short period. It may be used only one week out of the year. I believe this makes the overhead too high if the equipment lies idle for the other 350 days of the year. My answer would be that the man should spread out his harvest so that he gets many days' use out of a piece of machinery. That would mean he must have forages, grasses, grains, mixed meadows and corn. He will begin to harvest grasses in May and June, grain in July, and use the same equipment for corn later in the season. To avoid the need to take corn in a variety of conditions for silage he will need to plant several varieties. If he does not spread out the filling of his silos he will work himself and his machinery too hard in a burst of work, and will spend the winter recovering from a "work" attack. That is, of course, an overstatement.

Q. Can you mix grass silage and corn in one silo?

A. You certainly can, but remember you can take out only one of them at a time. If you have several silos, you have accessibility at any time to a variety of silages. You can blend them, taking advantage, for example, of the high palatability of corn and its high-energy content, and the somewhat lower palatability of ordinary orchard grass silage.

Q. Why grow the orchard grass silage at all if it is unpalatable?

A. Because in some regions it is an early crop, a most nutritive feed if handled right early in its growth.

Because we can produce corn so easily, we are tempted to produce all the corn we can. I won't quarrel with that provided we can get protein concentrates at the right price. But if we produce high-protein alfalfa or meadow silages and so spread our silo filling over the whole season, we can mix these high-protein silages with our corn silage to get the most efficient production of protein and energy feeds from our land. One plan is to have one big silo containing corn silage as the base ration, and a group of slightly smaller silos for those accessory crops which we produce because they provide a form of protein to add to the protein in corn. By having two silages available and mixing them, we can get one nearly constant ration for one kind of animal to eat all the time. This is an efficient way to produce. We have a relatively constant ration of silages, with hay or haylage, of course, to give the best chance for maximum production of milk or meat.

Q. What is haylage?

A. Haylage is a meadow crop dried to approximately 50 per cent dry matter. This is considerably drier than most grass silage. Haylage has come into prominence recently because the manufacturers of "sealed" silos have used it as a basis for some of their educational programs. Haylage in any kind of silo undergoes a fermentation somewhat like that of other grass silages. The manufacturers of "sealed" silos claim it cannot mold in their silo. Their argument is good. I can make this same silage in a conventional silo without mold, but then, I know how. Now I don't mean that to sound vain. Haylage is often tried in an open silo by people who don't know how and may not be willing to take the necessary trouble to learn.

Q. Can you do without hay when you have haylage?

A. I think so. I know a farmer near Chicago who wilts meadow crops to 50 per cent dry matter and puts them in a silo. The significant thing is that he has finished filling by Decoration Day. He takes advantage of the fact that young crops in an early stage of growth will take a greater amount of abuse than will the same crop two weeks later. If you cut and ensile a crop at the early stage the capacity for self preservation is vastly greater than it is two weeks later. That is why this farmer was making haylage in a tower silo in the 1930's. In a sealed silo, because air rarely gets in, it is easier to keep haylage in condition using a wide range of crops.

Q. Does stage of growth affect the silage?

A. Yes. Grasses and legumes have lost much of their self-preserving power once they have bloomed. Per pound of crop as silage, they have the maximum nutrient content when in the leafy

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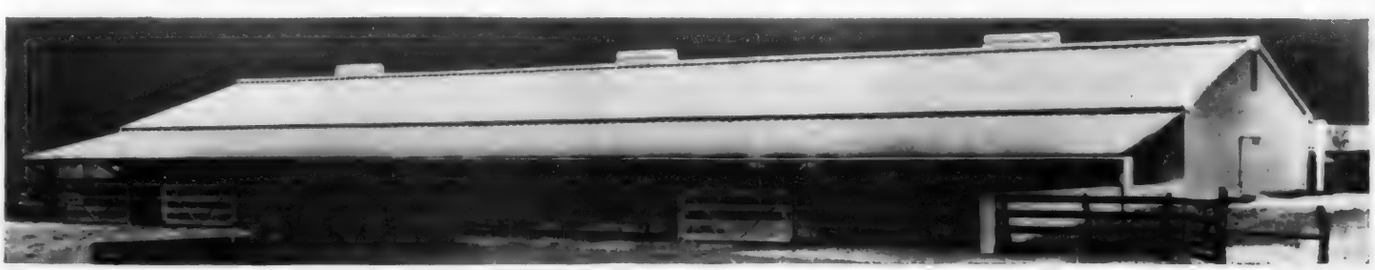

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stage. As stems develop, the accumulation of these stems and other undigestible material dilutes the protein and carbohydrates in hollow-stemmed grasses. Therefore the pasture and hay grasses are most useful when harvested in pre-bloom stage.

Q. As an aside here, Dr. Rogers, do you feel your concept of silage means we no longer have to put cattle on pasture?

A. No, no, it doesn't. The choice between feedlot and pasture is part of management. When pasturing a field gets the most animal products for the cost, by all means pasture. When total returns by ensiling exceed those by pasturing, then ensile the crop. Use the silo as a piece of equipment, which returns the most when the most silage passes through it. This supply must be active.

Q. What can a farmer begin with?

A. Well, I would start with two silos. I know a farmer near Orville, Ohio, who had two 10x40 tower silos, then got a 14x40. These he fills from 38 acres. He uses the smaller one for grass and the larger one usually for corn, but if he has any one empty he puts any other crop he can into it. He has it so arranged that he always has one silo of corn available. He always can blend the two silages with a little scheming.

Q. What percentage should be corn?

A. At least half the total supply of silage.

Q. When is a tower silo too big?

A. They have them now with 1,500 tons capacity—the 30x60 silo. Two of these would be 3,000 tons. As yet I cannot see using more than two in any one location because that amount of silage might better go into a large horizontal silo. When you are making as much silage as this you probably fully appreciate the value of silage and will care for it properly in a trench. With 3,000 tons you can have a pile with sufficiently small exposure so that the contained material will not suffer much from the weather. I spoke to a farmer recently who had a horizontal silo containing 5,300 tons—almost an acre of top surface—and yet had less than 10 tons of spoilage. He had taken care to compact and protect the surface properly.

Q. What about the smaller man?

A. The large number of farmers feeding 40 to 100 animals today will feed corn silage mostly, and grass silage when it is convenient. These men are feeding usually less than the maximum amount of silage and

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are likely to be ready to produce more. If they use 500 tons of silage a year they might need three 16x50-foot silos. This would give them the 50 per cent carry-over of silage and the choice of three containers from which to take silage. Farmers using less than 500 tons might be able to justify only two silos. Perhaps a 10x40 and a 14x40 for 20 milking cows, and two silos of 16x50 feet for 40 milkers.

Q. What is the bottom limit to the economical size of silos?

A. Probably a 10x40 is the smallest you can use now, if it is custom filled. Using two, one contains corn silage, perhaps filled on top of the carry-over of grass silage from last year. The farmer schemes so he mixes the two silages most of the time. He never shifts his ration too rapidly for his livestock.

Q. How much feed a day must be removed from a silo, and is this a problem?

A. Ten or twelve pounds of silage per square foot, from a top surface. I use this figure because whatever the density of the silage, this should keep good silage available. If the silage is fluffy, 12 pounds per square foot may be 5 or 6 inches. If it is compact, 10 pounds per square foot may be as little as 2 inches. This minimum necessary removal can become a problem especially in the summer when a farmer is using silage to supplement pasture. Then he may have to use only one kind of silage from one silo. With the large 30-foot silos some users tell us 75 cows can keep the silage on top of one of these silos from spoiling. These cattle would probably use the silage winter and summer and never leave the feedlot. A farmer may have to cover the silo to avoid spoilage if he removes too little each day.

Q. What about the cost? Aren't you asking a farmer to put a lot of money into this long-term investment?

A. Well, no. I don't believe it's a long-term investment. I think I can show how a silo can pay for itself in three to five fillings.

Q. Would you explain that, Dr. Rogers?

A. When you make silage you can preserve twice as many nutrients per acre, over a period of years, as you do when you put

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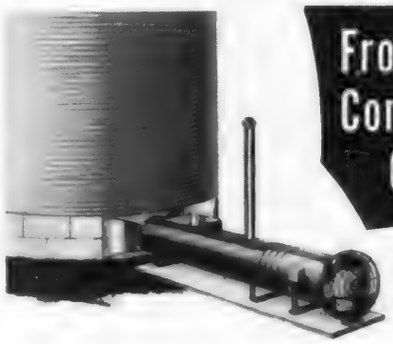

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up hay. If the total digestible nutrients in a standing crop are taken at 100 units, then over a period of 10 years you can expect to feed an average of between 40 and 50 units each year as hay. Under the very best circumstances, of course, you can feed as much as 72 units in field-cured hay, but this occurs only one year out of five, and in the general run of field-cured hay over a 10-year period, around 45 reach the animal when the crop is preserved as hay. When the same crop is made into silage, as many as 88 of the units can reach the animal. True, bad years or bad practices might reduce this to 75 or occasionally as low as 60, but on the average it can be well into the 80s.

Secondly, it costs about as much to process and bale hay and store it in the barn as it does to ensile the larger weight of silage in a tower silo. The cost is the same, including depreciation of all the equipment and buildings, and with the grass silage you have twice as many nutrients as with hay. This gain you can credit to the silo.

Now, for the cost of our silo. Usually the price of a silo will be close to the value of the contents in a single filling of meadow crops or whole corn.

Q. How do you value the silage?

A. One common way is to make the silage equal in value to one-third as many tons of hay of the same crop. Now as I showed above, half of the silage contained in the silo is a bonus, extra for having made silage instead of hay. Therefore, half of the cost of the silo is paid for in one filling.

Q. That means the silo would pay for itself in two fillings. Isn't that rather astounding, and didn't you say that it would pay for itself in three to five fillings?

A. Well, I say that to satisfy people who are argumentative about my figures. I'll give them two or three more fillings advantage, and I still have a good argument. Occasionally a single filling will more than pay for the silo. For example, a season in Kansas may be unfriendly to corn or even sorghum and all you have in your field is a drouth-stunted crop with no ears. That stunted crop is full of feed value in the stalk, but this is useful feed only when shocked to dry corn or silage. The maximum saving of nutrients is as silage because the life processes continue in shocked corn for a long time and they use up many of the nutrients. If such a farmer ensiled his corn he might be able to keep a livestock program intact and on full feed, and avoid selling his animals for lack of feed and buying them back at a considerably higher price. On many occasions such an action has saved the cost of the silo in one filling.

Dr. Rogers ended: "You have pressed me a lot on costs, but I am not thinking of economics only. I am thinking of how we can save the most of the nutrients our farms produce, and make that material economy pay. We are going to have to save and feed what we grow if we are to feed the ever-expanding millions of people in this world."

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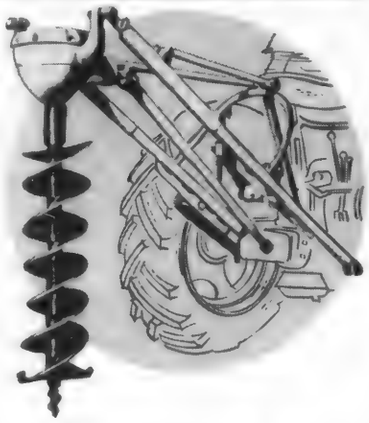

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NEW CROPS

(*Continued from page* 87)

two machines which will gather the beans without undue shattering. It is believed castorbeans could take the place of a million acres now planted to cotton.

Sesame: Another oil crop, sesame, produces more oil per acre than any other crop and may become for the Cotton Belt what soybeans are to the northern part of the country. Sesame oil is a valuable cooking oil and is also used in the manufacture of paints, soaps, and cosmetics. The greatest need in the development of this crop is the production of a high-yielding, non-shattering variety.

Research is being carried out at Clemson College to find increased use of the whole sesame seed for human food—it is now being used in bakery goods. The seedcake is about 50 per cent protein.

Kenaf: The tough fiber from this tall, thin plant can replace the imported jute fiber in the production of twine, burlap, carpet yarn and paper manufacture. The crop could be grown on cotton and peanut land and might extend into the Corn Belt. Work is still necessary to breed nematode resistant varieties and to develop mechanical harvesting methods. It has a potential acreage of around 200,000.

Rape

Rape: Rape can be grown further north than any other oil-producing crop. Some work is being done with this crop in Canada. The seed contains around 40 per cent oil which can be used as an edible oil and also has industrial uses. The crop has been grown for many years in Europe and Asia.

Guar: Because of its drouth resistance, guar was first introduced as a cover and green manure crop in the Southwest. When it failed to come up to expectations, interest in it dropped. It was revived, however, when it was discovered the seed of this legume provided a valuable source of mannogalactan used in the paper industry. Since then new uses for guar flour as a food and in industry, and the discovery that the bean is an excellent source of vegetable protein, have stimulated interest in the crop.

Bamboo: There are some 50 million southern acres which could be used to grow bamboo. The crop matures in about eight years and gives four times the production of cellulose for paper as does well-managed southern pine. It is useful for furniture making, too. In the Orient it is eaten as a shoot and we import a fair amount of

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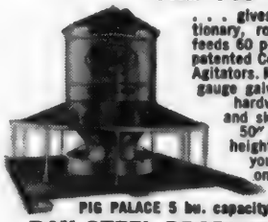

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canned bamboo shoot. It is estimated that with a program of demonstration, and research we could put 100,000 acres in this crop in a period of 12 years. Such a program would cost in the neighborhood of 25 million dollars. A little over a million of this would go for research on crops, engineering and utilization—the rest would be paid growers as an incentive.

Canaigre

Canaigre: Since we are dependent on imports for 85 per cent of our vegetable tannins used in the leather industry, great interest is being shown in this tannin-producing crop. Canaigre can be grown as an annual, and is well-adapted to the irrigated valleys of the Southwest. It can be planted, cultivated, and harvested mechanically to produce the tannin-rich roots. We need more efficient methods of tannin extraction.

Ramie: The fiber from this crop has about eight times the tensile strength of cotton or linen, and can be combed to the fineness of silk. It also has the curious quality of having 60 to 70 per cent greater tensile strength when wet than when dry. It takes dyes well and holds colors better than most other fibers. It can be grown successfully in Florida and the extreme South. The greatest difficulty with this crop at present is the lack of a mechanical method of decortication and degumming.

Sanseveria: Work on this fiber-producing crop is in the early stages, but its fine, strong, elastic fibers seem to give it a competitive advantage over sisal and abaca. Plant breeders are working toward the development of hardier, more productive varieties. Other research is being done to improve mechanical methods of extracting the fiber. This plant is widely known by its common name—monther-in-law's tongue.

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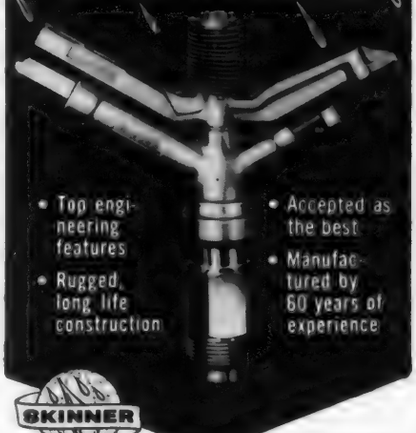

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FOUR-WHEEL DRIVE TRACTORS

(*Continued from page* 107)

implements, controlled by remote hydraulic cylinders on all big four-wheel drives.

Probably the biggest use of the machines will be in the West. But several Midwest and eastern farms have used Wagners for many years, and the tandem tractor, which has some of the same advantages of articulation and power, is common.

The newest four-wheel drive tractors are large. Ten tons, in a package eight by seventeen feet, is a lot. With up to three-quarters of a ton of liquid in each tire, the weight is enormous. Carrying a plow, the John Deere could be pressing down almost five tons a wheel. This could play havoc with old roads and weak bridges.

The merits of the different steering systems are difficult to compare. The conventional type is fine in level field work, as is also the articulating steering. Rear-wheel steering means the rear of the tractor can move sideways. This could be a problem with a plow attached, which would not take easily to crab-like motions. Working along the side of a slope, when a certain amount of turning is necessary, the crab steering is much the best. Conventional steering is next, and the articulation least good. This may be as important in earthmoving and contruction work as in farm use.

The articulated type of steering, using one hydraulic ram, is not perfect for highway speeds, and probably the next development will be a rotary hydraulic system to steer from this central point, though it, too, could have problems of smooth control.

For The Future

There seems to be no doubt about it, after several tries, four-wheel drive is this time here to stay in farming. It is not going to replace crawler nor two-wheel drives. It probably will be most common from 75 to 250 engine horsepower. For example, Wagner plans to introduce a fourth model soon, with about 100 engine horsepower, selling for about $11,500. However, one new foreign four-wheel drive tractor is 12 horsepower. Tillage speeds are going to rise still more and we are paying some penalties for speed of tillage already. Friction between soil and tool rises faster than the speed, and heat build-up can cause fast wear at high speeds. Nevertheless, we are probably destined to see plowing and plows evolve from the 2½ mph it was in the thirties through the 4⅓ or 5 mph of today to perhaps 6 or 7, even 10 mph in the future.

Perhaps the next step will be to produce an articulated tractor with rear-wheel or four-wheel steering (already designed by Michigan State University engineers). Already steering, clutches, and brakes can be operated through remote control hydraulics. Yet the operator still sits in the conventional position, towards the rear of the tractor. Maybe one day he will sit far behind the implement—as the horseman did.

Both plants came from the same field. *Just one difference*—the plant on the right with the vigorous root system grew in aldrin-treated soil.

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SAFFLOWER

(*Continued from page* 88)

also went after the types grown in India because farmers there have been growing this crop for oil and feed for centuries."

Gradually Dr. Claassen accumulated an impressive safflower collection. In his laboratory he tested each of them for oil and fiber content. The best oil yield was about 25 per cent and the fiber content was a disappointing 50 per cent or more. "The problem," Dr. Claassen recalled, "was that industry, to make safflower competitive with small grains, was unwilling to pay a high enough price for this seed, because of its low oil content. We had to increase the oil content."

Progress was slow. "Our biggest breakthrough," Dr. Claassen said, "came in 1942." That year the Nebraska scientists located and imported several types of safflower from Egypt and the African Sudan. These were the varieties from which he developed the new commercial strains, Pacific 1, Pacific 7, and Nebraska 10.

Where previous strains yielded no more than 25 per cent oil, these new ones yielded as much as 35 per cent, which easily puts them in the competitive market.

Young Man Went West

Dr. Claassen might still be working in Nebraska if he hadn't been offered, in 1950, the opportunity to move to Woodland, California, and become president of Pacific Oil Seeds, Inc.

It was his move to the Coast that helped bring safflower and California farmers together. His assignment there has been to direct experimental work in safflower production, direct a field service force throughout the western states, and help arrange contracts with growers.

"We don't claim any monopoly on safflower research," Dr. Claassen pointed out quickly. Others doing important work in this field include Dr. Paul F. Knowles at the University of California, and Dr. Joseph Culbertson of the U.S. Agricultural Research Service at Albany, California.

Dr. Knowles, whose specialty is plant breeding, spent several months last year traveling through the Middle East on another safflower-collecting expedition. "And besides that," Dr. Claassen added, "practically every western state experiment station is testing the crop's possibilities for both dry and irrigated growing."

Safflower is one of those crops so new on American farms there is no possibility of growing it as grandpa did. Edwin Emigh planted his first crop of it in 1957 after one of Dr. Claassen's crew asked him if he would like to try it. Emigh had already heard of safflower because the oil company had conducted demonstrations for farmers up and down the Sacramento Delta area.

They've consistently paid prices which Emigh considers fair. "Last year," he says, "the contract paid $70 a ton plus a $6 bonus."

"Last year," Emigh said, "I harvested a

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two and a quarter ton yield. This year I made only one and a quarter tons. A lot depends on the kind of year we have."

Emigh drills his safflower at the rate of 48 pounds per acre with a barley drill in six-inch rows. "I don't try to cultivate it."

His fertilization of the crop has been spotty. "I haven't fertilized every year, but our farm advisor and the Pacific Oil Seeds Company recommended 80 pounds of available nitrogen to the acre, either band drilled through a fertilizer attachment at seeding time or broadcast and disked into the soil prior to seeding. There's no chance of applying liquid fertilizer through irrigation water because we never irrigate safflower. Some folks do, though, out on the Delta."

Emigh uses the same combine with which he harvests wheat and barley. "I just slow up the reel and the cylinder, open up the concaves, and even in the slower gears I can still cut 10 to 12 acres a day with the 12-foot center bar," he said.

"When the hopper is full I move over and empty it into the truck and when that's full I drive it five miles to the warehouse for weighing and storage."

Next he turns sheep into the field. "I've found that they like the stubble," he said, "and will eat the stalks and lick up the shattered seeds."

First-Time Grower

Ten miles downstream, in the Sacramento River delta, is Sherman Island where L. J. Anderson of Rio Vista grew safflower last year for the first time. "It's going to be a steady part of my rotation," he now says, "as long as they're willing to pay around $70 a ton. Although this is my first year, I'm already convinced safflower production is a natural for our delta soils. It fits nicely into my program of barley, sugar beets, and alfalfa. I've got over 60 acres of Pacific 7 planted this year.

"I knew weeds were going to be my worst problem," Anderson says, "so I planted the last of February and first week of March at the rate of 25 pounds per acre in 20-inch rows with my beet drill. Then I cultivated twice before the safflower plants got too big. This kept weeds down. You can't spray safflower for weed control because you'd kill the safflower too. So you either have to plant it in 20-inch rows and cultivate, or plant on very clean ground.

"Due to the dry year we've had, safflower has ripened at least two to three weeks

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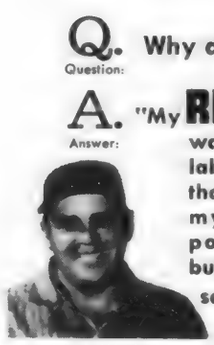
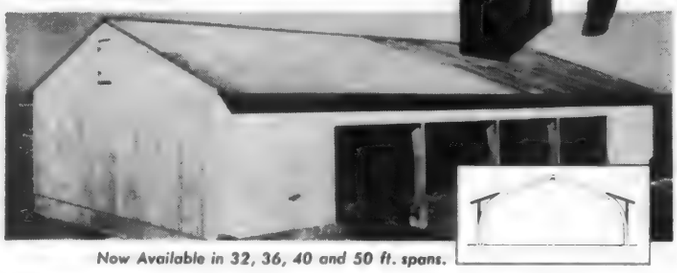

Arthur J. Workman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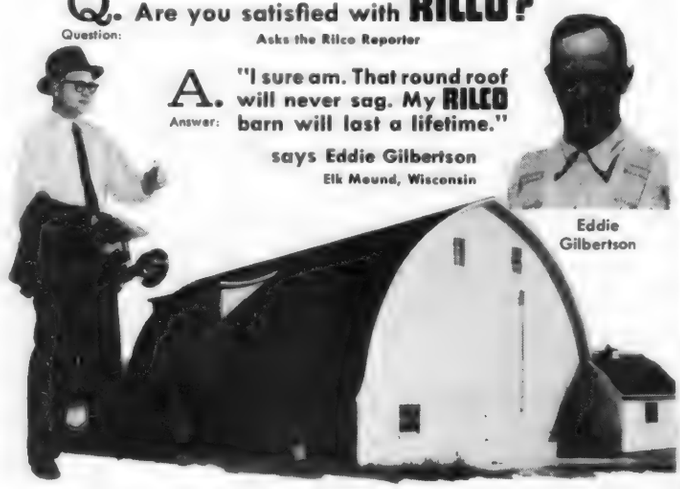
Eddie Gilbertson

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early. Some folks irrigate this crop; we don't as it has a long taproot and can reach sub-surface moisture, and our delta water table is normally down only 3 to 5 feet."

Anderson followed a barley crop with safflower last year and will follow that with corn or milo next. "I wouldn't recommend you follow safflower with safflower," he said, "because of weeds.

"My friends tipped me off on harvesting. Safflower heads shatter easily, so I slow my combine reel down to around 500 to 700 rpms, slow the cylinder down and open up the concaves. And I get out and start cutting early in the morning as a bit of dew will help prevent excessive shatter. But you can get fooled on that, too. If it has been too damp during the night the heads may be a bit tough first thing in the morning, so it takes a bit of judgment before getting off to a good start with the early morning combining."

Dr. Claassen's crew has, of course, come up with some conclusions on how best to handle this crop. "We've found that safflower can be planted successfully either by broadcasting, drilling with disk and hoe opener drills, or in rows with beet drills and Ventura bean planters. If the ground is weedy many farmers plant in 20 to 24-inch rows to allow for one or two cultivations."

Rates of planting vary. It is usually broadcast at the rate of 35 to 40 pounds an acre, or planted in rows at the rate of 20 to 30 pounds. "One rule we insist on," says Dr. Claassen, "is that, regardless of planting method, the seed not be buried deeper than 3 or 4 inches, especially if the land is to be rolled or harrowed after seeding. Most farmers wait until the plants are 3 to 4 inches tall before they roll the field."

Rust is the most serious disease of safflower. It is seedborne, and consequently all safflower seed is treated before it is planted. Rust is also soil-borne and the best control here is crop rotation.

"The worst insect pest we have to contend with is the lygus bug," Dr. Claassen said. "When the infestation reaches a point where 3 per cent of the buds have been blasted we recommend spraying with one gallon of 25 per cent DDT in 10 gallons of water per acre.

FIGHTS OFF WEAR AND TEAR...
Year after year after year...
PENNINGTON "30" MAKES MOWING A BARREL OF FUN!

Turns mowing hours into minutes . . . giving you more time for fun in the sun. Pennington, long a leader in producing large rider mowers, builds mowers that give years of trouble-free service.

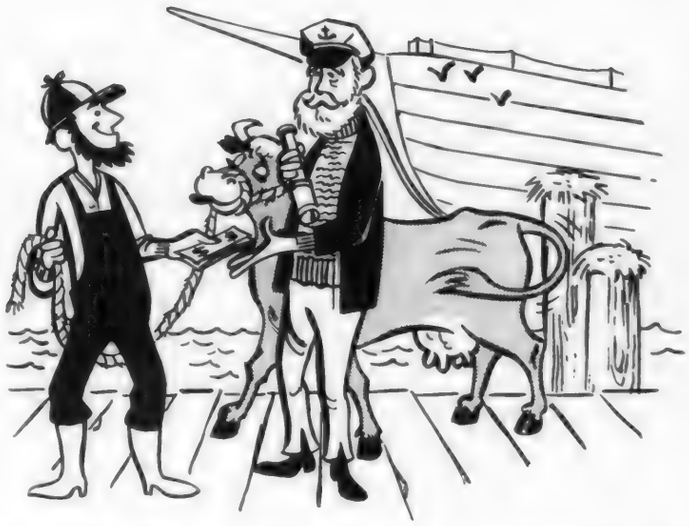
- Rugged, rear-mounted 4½ HP Clinton engine.
- Air-foil blade action assures crisp, even cut over 30" swath.
- 5 adjustable cutting heights, 6 speeds.
- "Safety-Step" on mower's discharge side prevents possibility of injury to operator or on-looker.
- Unusually low center of gravity —won't tip on steep banks.
- Blade-brake assures instant control of spinning blade.

Write for free catalog of Pennington Mowers—30", 36" 60" Sizes.

PENNINGTON MANUFACTURING COMPANY
ADDISON, ILLINOIS

Look what Peter Dunn Did!

by Fred Wenright



117 years ago, in 1843, Peter Dunn bought a milk cow on a New York dock from the captain of the British ship, *Washington*. He paid $3 for the animal and figured he had gotten the better part of the bargain.

His "bargain" became the *first* of a horde of animal diseases that have plagued farmers and veterinarians since that time.

His new cow was sick. She had contagious pleuropneumonia, although, I am sure Peter didn't know it. In the following years, Peter Dunn's cow cost the nation's farmers millions of dollars annually. Thus contagious pleuropneumonia became the first *major* animal disease problem in the United States. It was far from the last.

With these thoughts in mind I decided to find out first-hand how some of the nation's farmers were faring in the battle against animal disease. I began slanting my chats with them along those lines.

Eye Witness

I talked recently with a spry, 82-year-old Iowa farmer who recalled his father's difficulties with pleuropneumonia in the 1880's. "We had a nice little herd of dairy cows down in Sullivan County, Indiana. When pleuropneumonia hit, it wiped us out. We came out here, and I haven't seen it since."

The elimination of contagious pleuropneumonia was not an accident or coincidence. Pleuropneumonia had ravaged eastern dairy cattle for 40 years, during which time veterinary medicine was practiced mostly by laymen and M.D.'s in their spare time. It was striking the Western states in the 1880's when the real battle against it was organized through the efforts of the young, growing veterinary profession in the United States.

The Bureau of Animal Industry was created in the Department of Agriculture. The agency was headed by a veterinary surgeon, and backed by a force of research veterinarians and scientists. Five years later, the United States was the first large country to have eliminated pleuropneumonia from its herds.

Then Hog Cholera!

Although Peter Dunn introduced pleuropneumonia into the United States, we can't dump the blame on him for all livestock ills. At the turn of the century, hog cholera seriously threatened the nation's pork supply with severe, periodic outbreaks. Hog cholera was killing more hogs than found their way to the dinner table.

Last month, I had an interesting conversation about hog cholera with a friend of mine in Illinois. "I'm sure glad that we don't have to worry about that anymore," he said. A bit surprised, I reminded him that cholera was still a threat, costing hog farmers about $110,000 every day of the year. He smiled and answered, "That's somebody else's losses you're quoting, not mine. My vet makes sure my hogs are vaccinated every year.

"Once you get it," he emphasized, "you're done! I know. We didn't vaccinate for a while and lost about 60 head in 1936. An ounce of prevention is worth . . . you know. That's why I work with my veterinarian. We never have trouble. My vet claims hog cholera could be wiped out through an immunization program. I guess he's right, because that's what we do."

Back of this farmer and his veterinarian are thousands of veterinary researchers in private industry and in government constantly working to find better ways to prevent hog cholera and other animal disease.

But the farmer knows that *his* progress against the disease can only be as good as his personal initiative. That's why he seeks the expert advice of a veterinarian.

Brucellosis Campaign

"Brucellosis used to be my biggest headache," a Minnesota dairyman told me recently, "then I had to slaughter my whole herd during the brucellosis eradication campaign." He chuckled and said, "That gave me *bigger* headaches. But we licked it, around here anyway. We haven't had any brucellosis problems since. I always do what the veterinarian says—vaccinate. He's the doctor!"

The development of Strain 19 Brucella vaccine beat brucellosis. It's another example of the giant strides veterinary research men and veterinary practicioners have made in improving animal health. The nationwide brucellosis eradication campaign began in 1934. It was interrupted by the Second World War but was continued and pronounced successful in 1957.

Economic losses were reduced 470% in the 23 years of the campaign. The loss dropped from $140 million annually to $30 million. Despite a diligent fight by veterinarians and farmers, today's loss still amounts to an appalling $3500 every hour of every day.

Another Hog Killer

"What about erysipelas?" I asked a young Iowa hog farmer.

"Never heard of it," he kidded me. I went along with him, "How come?"

"Doc never mentions it, he just vaccinates and prevents it, and whatever my veterinarian does is OK by me."

"Say, that's a pretty trusting attitude," I said.

"You betcha. I trust Doc. Everytime I spend one dollar with my vet, I KNOW sure as I'm standing here, that I'll get an average of $5.78 in return, and I've got figures in black and white to prove it."

Erysipelas robs hog farmers of production revenue at the rate of $66,000 per day. Veterinary research* and the practicing veterinarian have provided all farmers with the means to prevent erysipelas, but the economic loss figure remains high.

Responsibility

Thanks to the veterinary profession, livestock production in the United States has made great strides forward since Peter Dunn's cow. This progress has been accomplished in the face of such devastating diseases as contagious pleuropneumonia, hog cholera, brucellosis, erysipelas, and many others.

Without the progress in the control and eradication of animal diseases, the livestock industry as we know it today would not exist. But there are still many problems that must be solved. Research alone is not enough. The findings of veterinary research must be put into practice. Disease control and eradication is the application of research.

Application requires the cooperation of the farmer and his veterinarian. In the last analysis, the initiative for prevention, control, and eradication rests in *your hands!* Use your veterinarian . . . it pays.

For additional information, write for the free booklet, "Veterinary Medicine as a Career." Address your card or letter to the American Veterinary Medical Association, 600 South Michigan Avenue, Chicago 5, Illinois.

* Research Laboratories, Inc., developed and introduced the first erysipelas bacterin in 1954.

Research Laboratories sells its products only through the graduate veterinarian: the key to better animal health practices on the farm.

Research Laboratories, Inc.,
Saint Joseph, Missouri

The Truth about Milking Parlor Stalls

Are all milking parlor stalls the same? Not by a jugful! Some may work when they're new, but what will they look like 5 years from now? It will pay you to compare before you buy.

Parlor milking is a great time saver. There's no doubt about it.

But unfortunately, all the talk about the time-saving and step-saving advantages has tended to obscure the fact that there are big differences between the various makes of stalls you can buy.

As a result, many dairymen have installed milking parlor set-ups in the belief that their troubles were over . . . but found it didn't work out that way.

Too late, they discovered that milking parlors *aren't* all the same, and that they were not receiving all the benefits they'd hoped for.

Before you select *your* milking parlor stalls, it will pay you to ask the salesman these questions:

Will they last?

Durability is certainly one of the important things you should be concerned with. Whether you choose a "cow-a-minute" *Herringbone*, a Gate-type, or a Walk-thru Parlor, it will receive heavy use twice a day, 365 days a year.

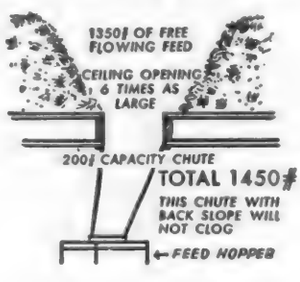
This is where CLAY Stalls offer you the advantage of extra strength, for they are built from *1.66" O. D. high-carbon steel.* Joints have been welded with stainless steel welding rods to give strong, smooth joints. Easy to clean, will not corrode.

Are they electro-galvanized?

Important, too, is the fact that CLAY (and *only* CLAY) Stalls are *electro*-galvanized. Tubing, sheet steel, bolts, and all other parts are protected from rust and corrosion.

In comparing CLAY life-time Stalls with painted or ordinary galvanized stalls, it is important to remember that CLAY'S process of *electro*-galvanizing with pure zinc provides a permanent finish that won't chip off as is so often the case with ordinary dip-galvanizing.

All ceiling support posts on the *Herringbone* stalls have stainless steel sleeves where they enter concrete.


1350# OF FREE FLOWING FEED
CEILING OPENING 6 TIMES AS LARGE
200# CAPACITY CHUTE
TOTAL 1450#
THIS CHUTE WITH BACK SLOPE WILL NOT CLOG
← FEED HOPPER

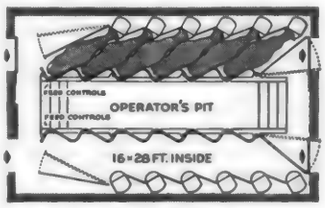
Will feed chutes clog?

Feed is metered down to each hopper through CLAY'S own exclusive *non-clogging* chutes (shown in the drawing above). More than 1400 lbs. of feed can be stored above each hopper.

Since it is so important that each cow be given exactly the right amount of feed according to her production, the extreme accuracy of CLAY'S metering device (patent is pending) is another feature you should demand.

How big are the feed pans?

The CLAY feed pan is 25" long by 18" wide . . . much larger than those furnished with any other make of stall. Furthermore, a steel guard between feed pans keeps cows from spilling and wasting feed.



Plan shows how cows stand side by side in Herringbone. Cows like it and are quieter.

Is it designed for the greatest possible saving of labor?

Since the purpose of your milking parlor is to save you time, you should make sure that it is fully designed to accomplish this purpose.

Here's where the research and experience of CLAY will pay off for you. Take the CLAY *Herringbone* Stalls for example. Every aspect has been carefully studied and tested. Every motion of the operator has been timed.

You almost have to see it to believe it. All sizes of cows can be milked in a CLAY *Herringbone*. Jerseys and Holsteins or mixed herds . . . they'll milk with ease in the same parlor. This is because CLAY engineers have carefully studied dairy cows being milked, and the angle at which they stand with relation to the operator's pit.

These, of course, are but a few of the features you should investigate, but the more closely you compare, the more reasons you'll find for CLAY superiority.

Easy financing

Be sure to ask your CLAY Dealer about the CLAY Purchase Plan. Learn how you can pay for your equipment while you are enjoying its benefits.

Write for more information

CLAY men are specialists in finding ways to help make your work easier. Ask your local Dealer or write directly to CLAY for information on Milking Parlors, Barn Cleaners, Silo Unloaders, Mechanical Feeders, and Crop Driers.

Just tell us which ones you want . . . and *write today!*

CLAY EQUIPMENT CORP.
302 Fulton St., Cedar Falls, Iowa

This can best be done by plane.

Most of California, the eastern part of the Northwest, the Rocky Mountain area and the Western Great Plains have a great deal in common that favors safflower requirements. Rainfall comes in the wintertime, with no rain to speak of from about June 1 until September 14. Safflower does its best and matures more naturally in dry weather.

One disadvantage in comparison with small grains, is that wheat and barley, for example, mature one to two months earlier than does safflower and are better able to utilize the available moisture during dry years. In addition, grain crops have the added advantage of being better able to compete with weeds.

"Even on good deep soils in areas that have 17 to 24 inches of rainfall, safflower will produce only from 60 to 75 per cent as much tonnage per acre as barley," Dr. Claassen admitted. "This presents a challenge to us to develop better varieties before the crop can be permanently established in light rainfall regions, but we're on the way."

Who Can Grow It?

Neither growers nor researchers know for sure just where safflower may eventually be grown. Like most crops, it requires soils that are fertile and hold moisture well. It seems to prosper equally well on adobe, clay loams, or sandy loams. "It is ideally suited to soil underlain with a high water table two to five feet from the surface," Dr. Claassen said.

"During the past four years we've started safflower production in Washington, Oregon, northern Utah and southern Idaho as well as a sizable area in Montana, Wyoming, Colorado and Nebraska."

There are efforts under way now to establish safflower in the Western Great Plains in keeping with the original idea of the Nebraska Legislature back in 1940. A new refining mill is in operation in Culbertson, Montana. It will probably take another three to five years to establish safflower in the Western Great Plains.

What of safflower as a new crop for the Midwest and the East? "I'm afraid that high humidity and too much summer rain precludes safflower's adaptation to those areas," Dr. Claassen said.

One of the biggest farms growing this newly important oil crop is the 15,000-acre River Farms in Yolo County, California. For several years this farm has grown more than 1,000 acres of safflower. This year they harvested 2,600 acres. They have worked safflower in with rice, their major crop. Their soil is deep, sandy loam with good water-holding capacity and a high water table.

"We have seeded safflower both in 14-inch rows with drills and broadcast by airplane," farm foreman Jack McGilvary said, "with equally good results. Broadcasting by air is much faster and costs no more." They've also used airplanes to spread 80 to 100 pounds of available nitrogen per acre.

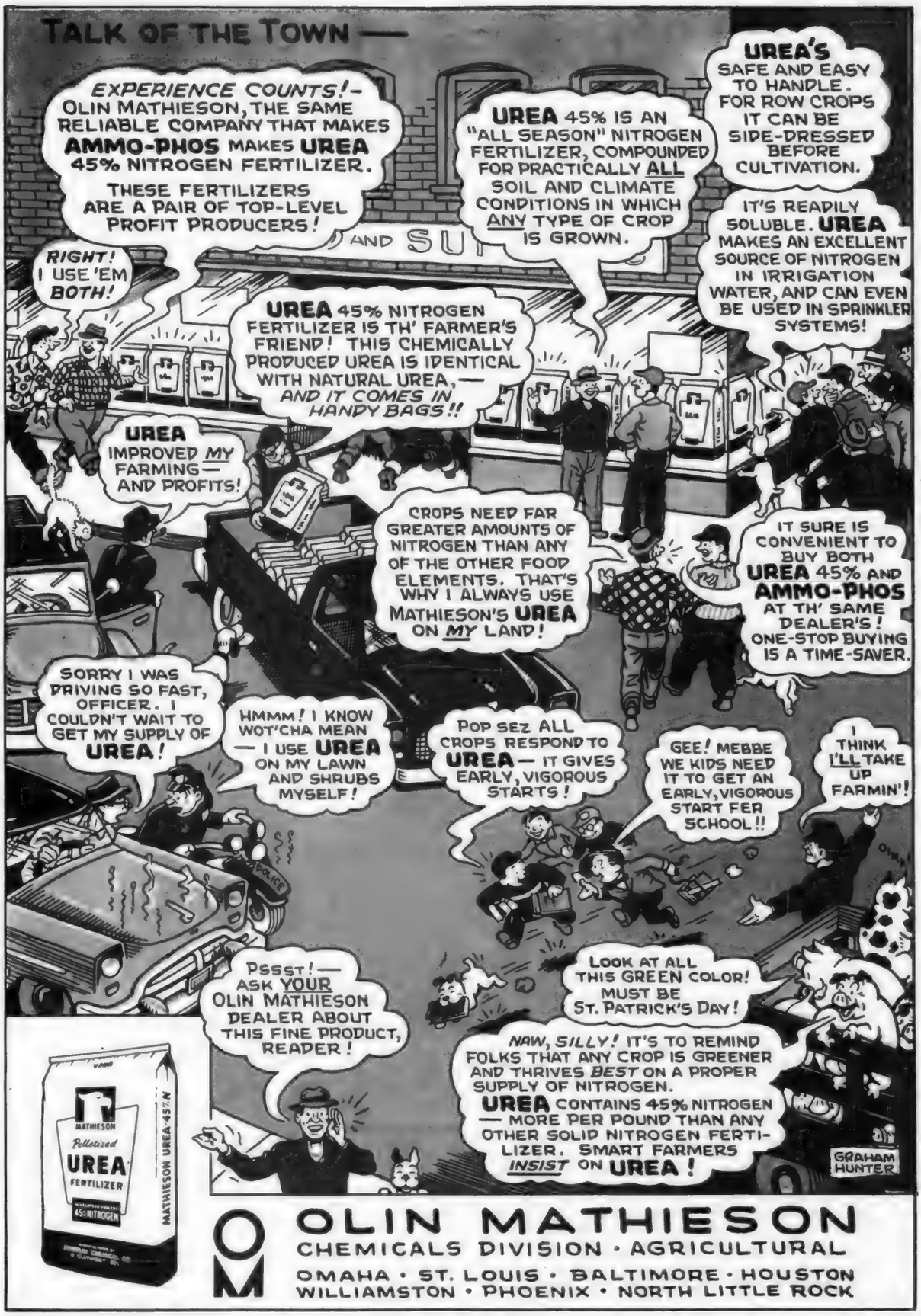
"In harvesting we use large 18-foot swath combines and usually have four working in a field at a time. With these we can cut 25 acres per machine. Our average yields with the N-10 variety," McGilvary said, "have been more than a ton per acre. We have made as high as 3,000 pounds. We burn the stubble," he added. "Haven't time for grazing. Want the land right back ready for rice the next year. Safflower is a natural for us with government controls on wheat, rice and cotton. There's no fuss yet with Uncle Sam on all the safflower acreage we can plant."

So far, there is no free and open market for safflower. The Pacific Oil Seeds Company has consistently stuck to its policy of contracting with growers to keep production and demand balanced and keep its growers making sufficient returns to maintain their interest in the crop.

Dr. Claassen feels that demand for the crop will increase. Surely safflower oil production is in its infancy here and there is no way of predicting now how far it will go as new uses for the oil develop and new oil-bearing strains come along.

One thing is certain, this thistle with the oily seeds has come a long way since the time, hundreds of years ago, when its principal use was a red dye to color the Turk's fez.

THE AUTHOR: Joseph Muir is a Utah-born extension agent, now farm advisor in Contra Costa County, California. He claims a spell at Texas A & M College taught him to brag, and California gave him something to brag about. He has a wide knowledge of the agriculture of the West, having worked in Texas, Washington, Utah and California.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EXPERIENCE COUNTS!— OLIN MATHIESON, THE SAME RELIABLE COMPANY THAT MAKES AMMO-PHOS MAKES UREA 45% NITROGEN FERTILIZER. THESE FERTILIZERS ARE A PAIR OF TOP-LEVEL PROFIT PRODUCERS!
UREA 45% IS AN "ALL SEASON" NITROGEN FERTILIZER, COMPOUNDED FOR PRACTICALLY ALL SOIL AND CLIMATE CONDITIONS IN WHICH ANY TYPE OF CROP IS GROWN.
UREA'S SAFE AND EASY TO HANDLE. FOR ROW CROPS IT CAN BE SIDE-DRESSED BEFORE CULTIVATION.
IT'S READILY SOLUBLE. UREA MAKES AN EXCELLENT SOURCE OF NITROGEN IN IRRIGATION WATER, AND CAN EVEN BE USED IN SPRINKLER SYSTEMS!
RIGHT! I USE 'EM BOTH!
UREA 45% NITROGEN FERTILIZER IS TH' FARMER'S FRIEND! THIS CHEMICALLY PRODUCED UREA IS IDENTICAL WITH NATURAL UREA,— AND IT COMES IN HANDY BAGS!!
UREA IMPROVED MY FARMING— AND PROFITS!
CROPS NEED FAR GREATER AMOUNTS OF NITROGEN THAN ANY OF THE OTHER FOOD ELEMENTS. THAT'S WHY I ALWAYS USE MATHIESON'S UREA ON MY LAND!
IT SURE IS CONVENIENT TO BUY BOTH UREA 45% AND AMMO-PHOS AT TH' SAME DEALER'S! ONE-STOP BUYING IS A TIME-SAVER.
SORRY I WAS DRIVING SO FAST, OFFICER. I COULDN'T WAIT TO GET MY SUPPLY OF UREA!
HMMM! I KNOW WOT'CHA MEAN — I USE UREA ON MY LAWN AND SHRUBS MYSELF!
POP SEZ ALL CROPS RESPOND TO UREA— IT GIVES EARLY, VIGOROUS STARTS!
GEE! MEBBE WE KIDS NEED IT TO GET AN EARLY, VIGOROUS START FER SCHOOL!!
I THINK I'LL TAKE UP FARMIN'!
POLICE
PSSST!— ASK YOUR OLIN MATHIESON DEALER ABOUT THIS FINE PRODUCT, READER!
LOOK AT ALL THIS GREEN COLOR! MUST BE ST. PATRICK'S DAY!
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NEW Western Bear Cat CHOP-MASTER

FORAGE HARVESTER and SHREDDER

This new Bear Cat CHOP-MASTER, like several other harvesters, is manufactured under the flail type patent that has proved best for this kind of work. In addition, however, the CHOP-MASTER has 15 points of superior construction which make it as outstanding as the Bear Cat Grinder is in its own field. A FREE bulletin shows all the CHOP-MASTER'S advantages. Send for it before you decide on what chopper you buy.

NOW BIG 72" WIDE CUT

- Cuts green feed
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- Mows weeds
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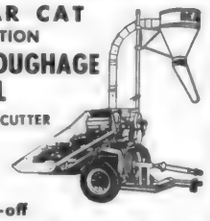
Model No. 72

NEW BEAR CAT COMBINATION GRAIN and ROUGHAGE MILL

ALSO ENSILAGE CUTTER

No. 4A TRAILER MOUNTED

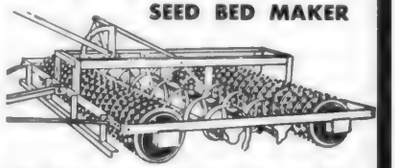


for power take-off

Traveling feed table is especially designed for large quantities of loose or baled roughage. With cutter knives and heavy swing hammers. Grinds any feed, green, wet, dry, snap or ear corn, with farm tractor and no monkey business. Furnished with or without trailer mount and power take-off. Nine different models and sizes.

For the best seed bed possible

NEW WESTERN BEAR CAT SEED BED MAKER



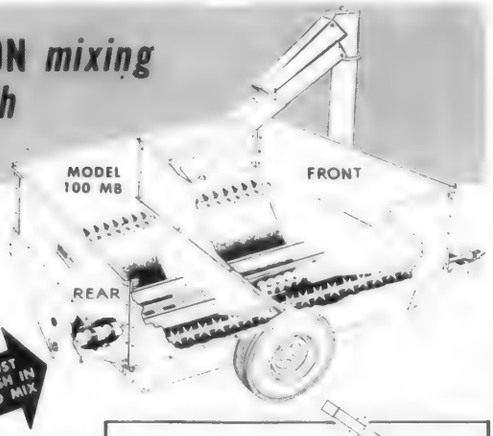
Once over plowed fields, twice over sod, and the Western Bear Cat leaves a clean, mellow firm seed bed. Three-way action: Front leveling bar levels clods, high sod. Sprocket packer pulverizes and firms. Spring teeth clean out weeds. Rear packer and mulcher again pulverizes and firms. Leaves surface mulch—the best seed bed possible.

For full information and name of your dealer, write Dept. FQ58

WESTERN LAND ROLLER CO., HASTINGS, NEBR.

Manufacturers of fine ranch and farm machinery for over half a century

Low cost PUSH-BUTTON mixing FASTER unloading with HELIX MIXER BLENDER

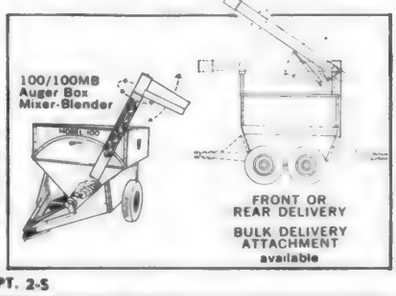


★ You get hauling, p.t.o. mixing and blending, and unloading in one unit for up to $400 less than a stationary mixer of the same capacity.

★ Up to 6,000 pounds capacity—holds 120 bu.—145 cu. ft. with extension sides and tandem axles. Low to ground—64" high—easy to fill.

5 FORCE FEED MIXING ROLLS ***in each compartment!***

Mixes and blends to commercial standards on your farm. Also available as attachment—add Mixer-Blender kit to your Helix Model 100 auger box anytime. Converts to bulk delivery unit—discharges 33 in. to 16½ ft.



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MORE PORK FASTER WITH TESTED BOARS

Write for Folder

CONNER PRAIRIE FARMS

R. R. 4 Noblesville, Ind.

12 YEARS OF CONTINUOUS TESTING

USE SETS THE PATTERN

(*Continued from page* 86)

B-1 Storage Costs

Silo	Construction Cost
Upright or vertical	$15 to $40 per ton
Horizontal	$ 2 to $ 6 per ton

A 25-year life is assumed, thus depreciation is 4% of new cost per year; interest, taxes and insurance are 4% of new cost per year, and repairs are 2% of new cost per year for a total of 10% of new cost per year.

This amounts to $1.50 per ton to $4.00 per ton per year for uprights, and $4.50 × 10% = 45c per ton for other silos. For the upright, assume $1.80 per ton × 650 tons = $1,170 per year, and for the horizontal, 45c × 650 = $292.

Ear Corn Silage

Assume: 60c to $1.20 per bushel construction cost; 25-year life; 1.7 cubic feet per bushel. With interest the cost is 9c to 18c per bushel; without interest 5.2c to 10.4c.
Using a figure of 12c × 4,000 bushel = $480.

Shelled Corn Silage

Assumptions: Construction cost 50c to $1.00 per bushel; 1.4 cubic feet per bushel storage space required; 25-year life. With interest, 7.5c to 15c per bushel; without interest, 4.5c to 9c.
Using a figure of 9c × 4.000 bushel = $360

Ear Corn

With interest and labor 9.8c to 14.2c per bushel. Without interest, 4.7c to 7.9c per bushel.
Using a figure of 10c × 4,000 bushel = $400

Shelled Corn

10.4c, with interest; 5.3c, without interest.
Using a figure of 10c × 4,000 bushel = $400

B-2 Storage Losses

	Upright	Horizontal
Whole Plant Silage	12%-15%	15%-20%
Ear and Shelled Corn Silage	5%- 8%	
Ear Corn	½% per month	
Shelled Corn in Tight Bins	¼% per month	

Vertical silo—13.5% × 97.5 (2.5% of the crop has been lost) × $4,000 = $525
Other silos—18% × 97.5 (2.5% of the crop has been lost) × $4,000 = $702
Ear and Shelled Corn Silage
Ear 6.5% storage loss × 3,900 bushels = $253
Shelled 6.5% storage loss × 3,800 bushels = $247
Grain ½% × 8 months × 3,800 bushels = $152
¼% × 8 months × 3,600 bushels = $ 72

C-1 Unloading Equipment

Figures based upon Bulletin 360 Ohio Agr. Ext. Service Table 2 for relative values on silo unloaders, operating from top of silo.
For Ear and Shelled Corn, Use Elevating Equipment. If ear corn needs to be shelled, custom operators will shell at 5c per bushel. 5c × 3,800 = $190.
Likewise commercial operators will grind and mix at 20c per 100 lbs. For farm, this would take care of labor too.

Ear Corn $\frac{20c}{100} \times 3,800 \times 70$ lbs. = $532

Shelled Corn $\frac{20c}{100} \times 3,600 \times 56$ lbs. = $403

D Feeding Value Gain

The following are the relative values of corn when fed as indicated. The figures are the results of work at the Ohio Experiment Station:

Shelled Corn	100
Ear Corn	118
Whole Plant	162

They represent relative harvested, stored, and ready-to-be-consumed yields.

ANNOUNCING

HALE's New "TITAN"

The "Powerhouse" of Modern Irrigation Pumping Units

VALUABLE DISTRIBUTOR FRANCHISES AVAILABLE
Write today for details on Protected Territories

A completely NEW Irrigation Unit capable of heads up to 300 ft. (130 p.s.i.), or capacities up to 2600 GPM on a 10-foot actual suction lift!

MATCHED POWER: Hale's New "TITAN" Type SCIR is *not* just a regular pump adapted to a larger engine to get more performance. It's a completely new irrigation pump specifically designed to match modern V-8 engines. No need to worry about overloading this "powerhouse"! Remember, too, the "TITAN" is manufactured to the same exacting standards that have made HALE famous for quality pumps for over 45 years.

BIG CAPACITY: A Hale "TITAN" has ample reserve to do the big jobs with ease—so why risk overloading inadequate Units or using two smaller pumping units to do jobs the "TITAN" will take in its stride.

ECONOMY: Now is the time to make your irrigation plans for the coming year. Insist on looking into the entire Hale line including the new "TITAN"—make Hale your quality source of irrigation pumping units—all with matched power. See your local dealer today . . . or write to: Irrigation Division.

HALE FIRE PUMP COMPANY — CONSHOHOCKEN, PA.

	Silage	Ear Corn Silage	Shelled Corn Silage	Ear Corn	Shelled Corn
Bushels Harvested	3,900	3,800	3,700	3,600 Av.	3,500
Storage Loss	525	253	247	152	72
Net bushels	3,375	3,547	3,453	3,448	3,438

Assume an Average Base of 3,400 Bushels.
Cob Gain in Feed Value = 18 × 3,400 = $610
Total Gain 62 × 3,400 = $2,100
Stover Gain 2,100 — 610 = $1,490

E-3 Fixed Annual Drying Costs

Method B— 9% of new cost each year
9% of 1,200 = $108
Method C—13% of new cost each year

Method D— 9% of 1,200 = $108
13% of 800 = 104
$212

E-4 Adapted from various sources—largely Purdue.

F Discount Rates

Equivalent Value on which the discounts are based.

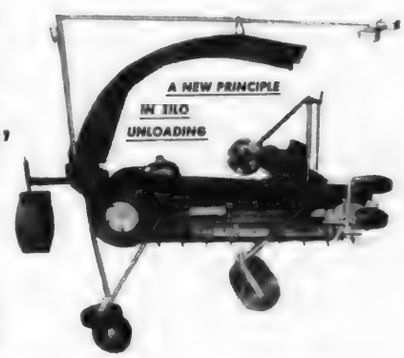
% Moisture	Based on $1 Corn
30	.828
27.5	.86
25	.888
22.5	.917
20	.947
15.5	1.00
12.5	.966
10	.939

If corn is worth $1 per bushel, the actual value of the corn in a 56-pound bushel is only 82.8c. The remainder of the material is water. Where the moisture discount is 1c per ½% moisture above 15.5% the seller is penalized 29c per bushel (14.5 × 2c). This means he would only receive 71c for the corn if he delivered it wet. However, if he dries it he will receive $1 a bushel for the grain but since he delivers less than a bushel (the water having been removed) he will net only 82.2c. The difference between the 82.8c he gets for dry corn and 71c for wet corn is 11.8c, the net discount shown in column 1, section F-1 of the table.

F-2 Hauling charges from local elevators.

F-3 Shelling charges also from local elevators.

LOUDEN'S NEW "LEVEL-CUT" SILO UNLOADER



Louden's new "Level-Cut" Silo Unloader rests directly on the silage. Completely eliminates tripod equipment. And the "Level-Cut" gives you a cut of the same depth on each revolution. No uneven spots even in the coldest weather. Louden's "Level-Cut" lowers itself as it cuts. Operates on a chain saw principle. Hammermill-type cutters loosen silage. High-speed chain with flights carries silage through restricted opening to discharge outlet at 35-40 m.p.h. No large chunks get through. Your cattle get fluffy silage every time. When your silo is empty, your Louden "Level-Cut" is taken out through the bottom door and easily transferred to another silo.

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AUTO-LITE®
SPARK PLUGS

THE HUNTER OF WASHABAUGH COUNTY

(*Continued from page* 72)

than 40 years. In that time he has handled close to 500 hounds. He is satisfied that the Australian greyhound has no equal as a coursing dog.

"I started out training bird dogs—pointers," he said, "but there's no sport in that any more. The season's so short nowadays you can't make a good dog. It used to be you could hunt all year and a dog had a chance to learn something.

"In running coyotes I've used wolfhounds, staghounds, greyhounds and all kinds of crosses. The Australian greyhound can run faster and fight better than any of them. He has a much better coat of hair than the English greyhound and better feet. When he fights he goes right for the throat.

"I had some dogs once with a lot of staghound in them. When they'd get a coyote they'd go for his belly and they'd take an awful beating before they finally had him whipped.

"They'd never stay with a critter after they'd killed it, either. They'd get one over the hill and out of sight somewhere, kill it and leave it and you'd never find it. These dogs stay right there until you get to them.

"Here Jill! Come on Jerry!" he sang out. "Let's go, fellows!" and the dogs were back in the Jeep.

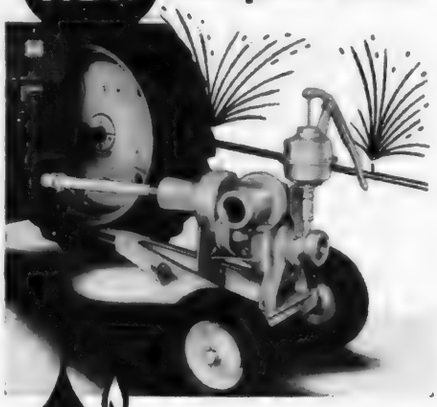
As we started across the range, the long shadow of the Jeep moving ahead of us, Herb put on his glasses. "I never had any use for these things," he said, "till they told me I needed them to see the coyotes; then I really ran to get them." His store teeth went into his shirt pocket. "When I get tense," he explained, "I bite something fierce. It's hard on those teeth." The decks were cleared for action.

Our hopes for snow had not been fulfilled, though there had been a hard frost during the night and snowbanks from a heavy storm some weeks earlier still lay in the draws and below the ridge of the hills. Our first maneuver was to circle the scattered remains of some calves which earlier in the year had tasted the forbidden delights of a poisonous weed. "There's nothing like a coyote to clean up carrion," Herb said. "Even when there's nothing left but the hide and bones they'll come back to gnaw a little. Thought we might see some signs here." But no signs were evident, so we headed out on the open range.

The dogs were eagerly watching the passing scene as the Jeep bounced over well-worn cow trails, bucked through prairie dog towns and crawled in and out of breaks a man afoot would have had a hard time navigating. "It takes a good driver to hit all the bumps," Herb bragged as his practiced eyes searched the landscape.

Off to our right we saw the Stoddard horses. "I've got no use for these mechanical contraptions." Herb said. "I still use horses all I can. Work five teams. Put up all my hay with horses; use 'em on my sweeps, my stackers, everything. Some of

NEW for '60 a complete line



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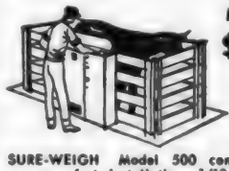

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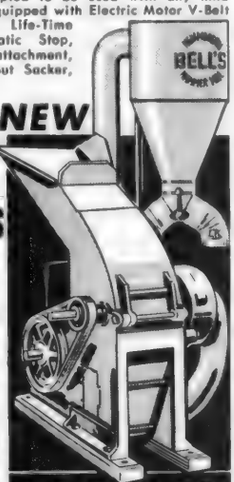

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these young fellows put up 30 tons of hay and it takes them $30,000 of equipment to do it."

We turned toward the horse herd because, as Herb pointed out, coyotes like to stay close to horses or cattle to use them as their sentinels. This bunch, however, was innocent of fronting for coyotes.

We came up to a fence. Jeeps can't jump, but a barbwire fence is no obstacle to a man with pliers and hammers. Before I had a chance to settle myself in the driver's seat, Herb had the wires down. I drove across; he re-stapled them and we were on our way again in no more time than it takes to open a gate.

A cow was the first thing we spotted on this big, broad pasture; and immediately the Stoddard philosophy on cattle came out. "There's only one breed of cattle," he said, "the Hereford. If you want to cross 'em, cross 'em with two tons of alfalfa hay and you've really got something."

By this time the sun was well up and we'd had nary a sign of coyotes. "If we don't see one soon we'll turn the dogs on a jack rabbit," Herb said. "Ordinarily, I carry my gun along and shoot rabbits for dog food. It's hard on the hounds to run rabbits on this hard ground. The best rabbit chasing is when the grass is long and the ground is soft. Just last week Gyp broke her toe running a rabbit across a piece of wheat stubble. That's why I left her home this morning. When the ground gets hard a rabbit can run much faster. Why I've seen---"

At that moment a long-eared jack rabbit looking half as big as an antelope jumped up no more than ten yards off the right front wheel. Herb gunned the Jeep, cut it hard to the right to start the dogs in the right direction and pulled the rope. Without a sound the hounds exploded from the box. Jerry, a big brindle, hit the ground first, with Jill, a little red bitch, right at his loin. Running for his life the rabbit found a cow trail warmed just enough by the morning sun to make it slick going for the hounds but perfect for his fur-shod feet. He was pulling away from the dogs as the trail began to curve in a direction that would give the hounds the edge, so he left it and headed for a snowbank, an old trick for a wise rabbit whose strategy is to scamper lightly across the snow in which the hounds will flounder.

But nature failed him. Days of alternate

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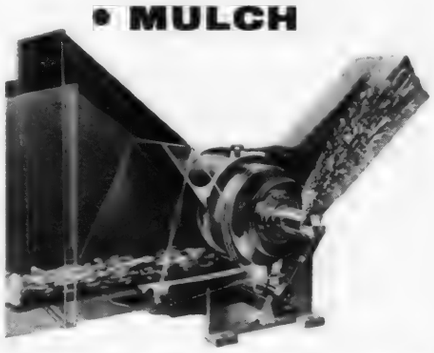

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Methods which successfully result in *clean, non-stop plowing* and *effective shallow cultivation* are the principle subjects of a new tillage booklet prepared by Lantz Manufacturing Company.

The coulter section of this book describes how Lantz Coulters cut trash as they till. This section gives information on how to obtain the right coulter type for your soil.

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freezing and thawing had crusted the snow hard enough to carry a man and as the dogs raced over it they were gaining with every leap. Jill was a length ahead of the pack now. The action was beautiful. Leveled out for all they were worth the dogs seemed to fly rather than run; their feet barely touched the ground. Seemingly, their motion was completely effortless. Suddenly, Jill gave that little extra push. With fangs bared she grabbed the rabbit in the hip; another dog slashed at his throat and the race was over, little more than a minute after it had started. The hounds made no effort to devour the carcass. Immediately they relaxed, and it was quite apparent they were tired dogs. They had run about a half mile at top speed. Their tongues lolled out, twice the length of their mouths. Coughing and panting they jogged slowly back to the snowbank, sprawled out on its cold surface, licked it and bit off chunks to slake their thirst.

"They're still a little soft," said Herb. "I guess I've been feeding them a little heavy and they haven't run enough yet this fall."

As the hounds caught their wind, Herb went back to talking about his dogs. The hounds are 18 months old before he starts hunting them. By the time they are four years old they have started to slip. There isn't too much to choose between the male and the female so far as hunting is concerned, though Herb thinks the bitch may be a little smarter and she's always hunting, doesn't have the distractions which sometimes bother the male.

In selecting his hounds he looks for a short-coupled individual with a good, straight hind leg. It should have catlike feet which give it the appearance of almost standing on tiptoe. By the time the hound is ready for serious running it should be well muscled over the kidney. A pointed nose seems to indicate speed. Herb says he wouldn't think of raising pups out of a dog with poor feet; and a crooked-legged dog will cut itself to pieces running in the badlands. The English greyhounds, he feels, are inclined to have tender feet and a poor coat of hair.

When it comes time to train the youngsters, Herb always likes to start them with older dogs. The most important lesson is the one the man must learn himself: "If you teach one little thing to a dog in a day you've done darn well," he said. "Next day you have to go back and start all over and then add one thing more. It's the same in training a horse."

He always rides horseback when he is starting a green bunch. He has better control over them and they have every opportunity to become acquainted with the environment in which they will be hunting for the rest of their lives. It helps to get them to use their nose and develops their trailing ability, qualities notoriously rare in greyhounds which hunt by sight.

"Some of the young hounds in this pack I started to train without an old dog along," Herb said. "I sure got disgusted with them

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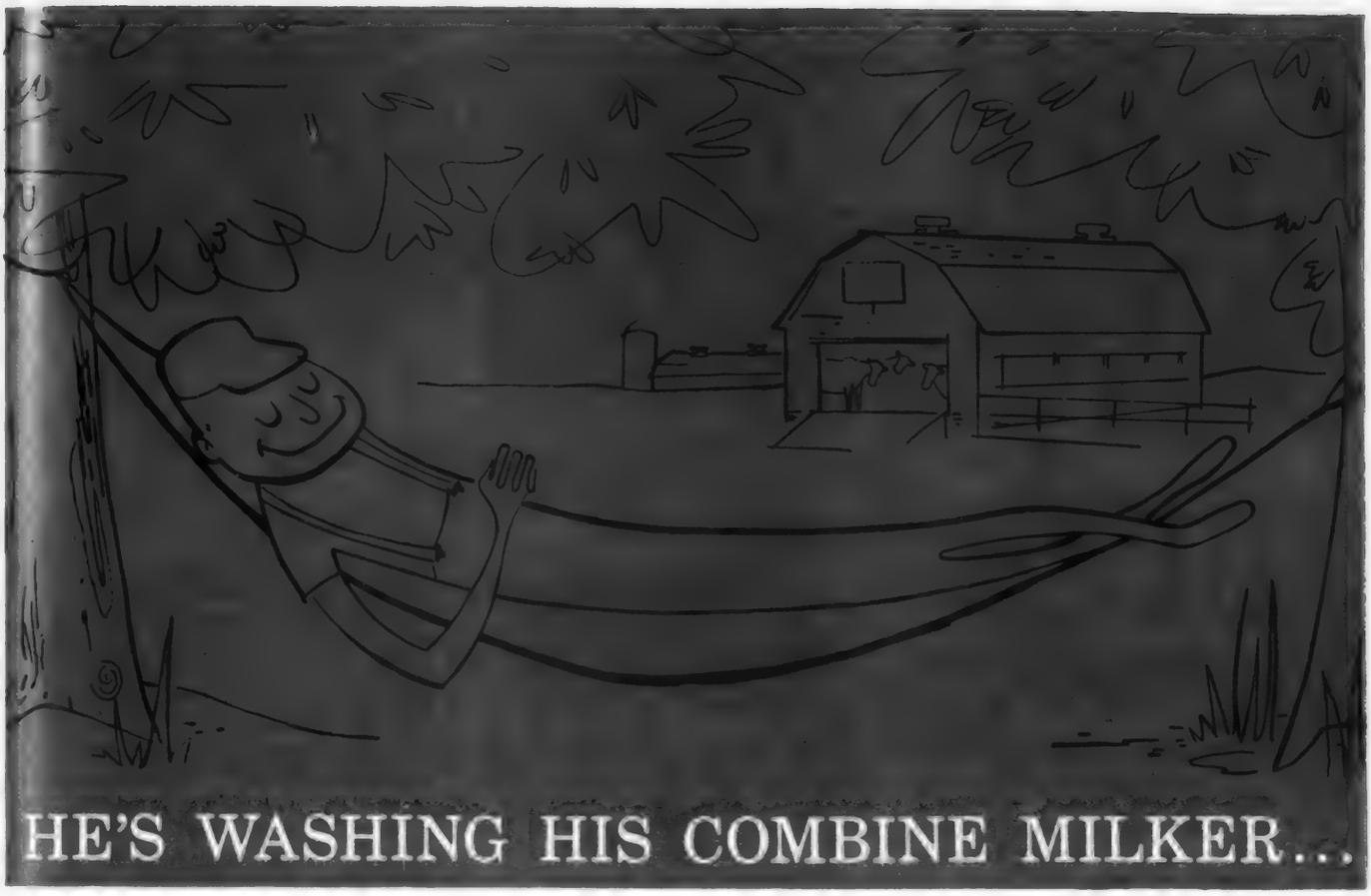

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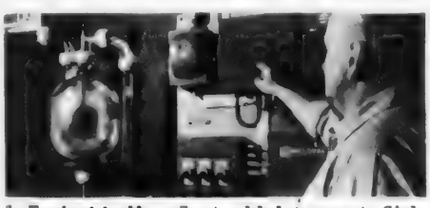

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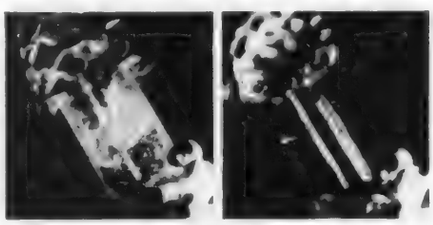

3. "Turbulent Action" gives you more sanitary cleaning. This test shows why. Bottle at left is *half-filled* with water. When shaken, turbulence occurs. This is how De Laval *vacuum* cleaning works. It pulls water through lines at up to 35 miles an hour with great turbulence to scour away fat and milk deposits. Bottle at right is *filled* with water. When shaken, no turbulence occurs. This is how *pressure* systems work. They fill lines with water and push it through at about 5 miles an hour without turbulence. Only "Turbulent Action" can give you truly sanitary lines, lowest bacteria counts.

4. No Re-Circulation of Rinse Water. All other in-place systems re-use the same rinse water. Only De Laval does not!

5. Corrosion-Proof Couplings. Other pipelines use metal couplings that corrode. Only De Laval Combine couplings are made of *Nylon*. Never corrode or rust! And our exclusive dual-pressure silicone gaskets prevent dams in line where bacteria can multiply.

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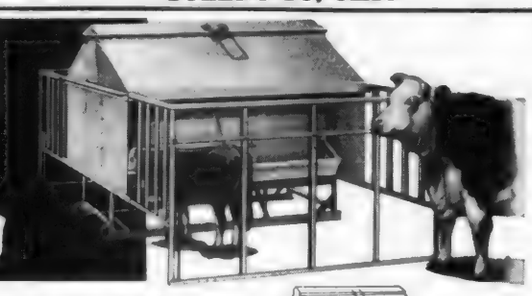

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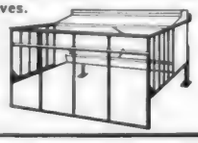

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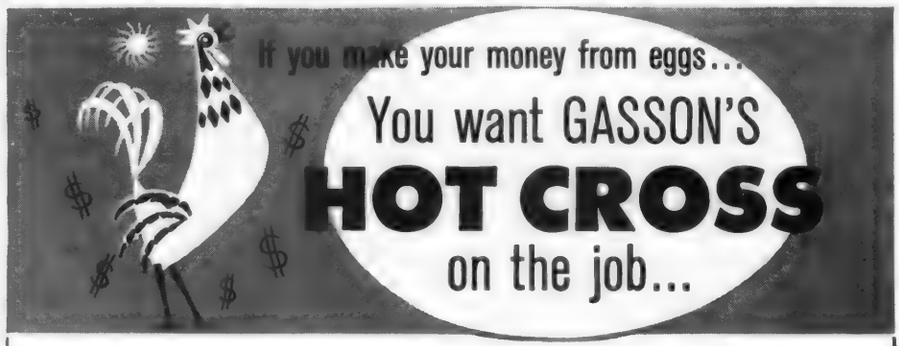

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that first morning. I started out in the pasture north of the house and the first thing they saw was a hawk, so they took after him. Then, pretty soon I saw a coyote—and they just sat there and looked up at me.

"I rode on a little farther and came up on a flat and there were two coyotes and an eagle. The pups took after the eagle. Next thing we came to was a prairie dog town and they had a picnic chasing prairie dogs.

"Finally, we came up on another flat and there were two coyote pups. That brindle bitch spotted them and took out after one of them and all of a sudden the whole bunch came alive and they ran him down and caught him. After that they had a rough idea of what they were born for."

I asked Herb how he corrected an erring hound. "Sometimes," he said, "you have to get a throw rope on them and drag 'em back and give 'em a whipping. But with a dog that really knows better, I just get down and pull his ears and say, 'You know better than to do that—running prairie dogs when you should be hunting.' "

Disease problems have never bothered Herb with his hounds, but accidents are inevitable. "I had a young dog I called Danny Day. He had just started going hotter than a cowboy's pistol when one day he kicked up a rabbit in the badlands. He was right up on that rabbit and was reaching for him when the rabbit turned and Danny plowed smack into a bench. Broke his neck.

"Another good dog I loaned out killed chickens and the neighbor shot him. He was a two-hundred-dollar hound, too.

"Kinky got too hot running a deer and died. Greyhounds can stand less heat than any dogs I know. They'll keel over just trotting alongside a wagon on a hot day. And Fanny got kicked off a cliff in the badlands.

"Two dogs I lost fighting. They'll kill anything they get down. You can take a bunch of dogs that have been hunting together for years and if they get to fighting and one of them gets down that's the end of him. You can't let 'em fight."

The hounds were rested now. At Herb's signal they leaped back into the box, we threw the rabbit in the back and were off for more hunting, Herb talking continually, his informative lectures spiced with salty cracks every so often. "I grew so tall 'cause I stayed green so long," he said. It was apparent his shade of green was the same as a C-note when he drove right smack to the spot—in the midst of a huge piece of range without tree or landmark—where two weeks earlier he had seen an instrument off a weather balloon. "I was chasing a coyote when I saw it and didn't have time to pick it up," he said as he stored it under the dog box. "We'll take it along and send it back where it belongs."

By now the shadows were as short as they ever get on a December day and the prospects of catching a coyote were getting as short as the shadows.

"Skinny's Springs is just over the next hill," said Herb, "we'll go on down there

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and if we don't see anything we'll go home and see what Mom's dinner is like."

At that instant we caught a split-second glimpse of a couple of coyotes silhouetted against the cloudless sky as they turned tail and disappeared over the brow of the hill two hundred yards in front of us.

"I knew there were two families raised here last spring. Those must be some of the pups," Herb said under his breath as he stamped down on the accelerator and we took off like the well-known scared ape. But when we topped the rise there were no coyotes to be seen. Further, at the foot of the hill before us was a rough draw, one of the very few of the kind that Jeep had to go around rather than across. By the time we got to the other side it was apparent our quarry had left the country.

But that was the end of any thought of dinner. Herb had tasted something more exquisite than meat and potatoes and he wasn't about to quit now.

"A coyote always wheels and runs with the wind if he can, so you can't sneak up on him," he said as he hauled the Jeep to leeward. For the next two hours it seemed like we combed every break and draw in Washabaugh and Millette Counties. St. Peter's was the only gate we didn't negotiate and at times we even came perilously close to it as the Jeep twisted and plunged, up, down, around and across terrain a self-respecting mule would have hesitated to set foot on.

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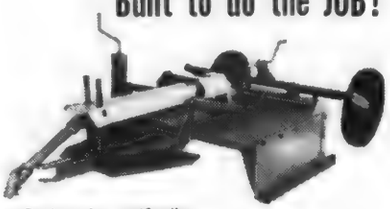

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In a dozen spots where there were no gates Herb went into action with his pliers.

And all the while I learned about coyotes. "They're smart," Herb said, "one of the smartest things in the wild. That's why it's such sport to hunt them this way. Those gobblers who hunt them by plane have just about cleaned them all off the level land. Even though they return to the breaks later, the coyotes breed and make their dens on the level land. In weather like this a coyote will come over a hill and lie in a draw with the wind coming down the draw so he can see everything below him and the wind will warn him of what's coming up behind.

"They're so darn smart they even seem to change color to blend into the land where they live. In the badlands they almost look like a grey wolf; here in the red grass they get a kind of reddish tinge; and over on that gumbo land they get almost black.

"I had some hounds once that had a lot of stag in them. There was an old coyote around here that knew just how fast those dogs could run. Every time I'd turn loose on him he'd put out just enough to stay a little ahead of them. He'd breeze along and look behind to see what they were doing and then all of a sudden he'd drop over the wall into the badlands and that would be the end of it.

"I finally fooled that old son-of-a-gun, though. I got some real fast greyhounds one day and by the time he'd wised up to the switch they had him.

"And fight! Pound for pound nothing has more fight than a coyote. They talk about bobcats, but a bobcat's easy to stop. A coyote fights to the last breath. Some gobblers claim they've heard them cry like a baby when they're caught. I haven't. I've never heard one whine. They just stand there and take it.

"That's what was wrong with those staghounds—besides having the slows—they didn't know how to fight. They'd go for the belly and they'd come back all chewed and clawed to pieces. These greyhounds go for the throat and it's all over quick.

"How fast can a coyote run? Some of these fellows get a couple of drinks in them and come up with all kinds of silly estimates. I've heard some of 'em say they've clocked 'em with a pickup going 50 and 60 miles an hour. But that's the trouble with a pickup, half the time the hind wheels are off the ground. I'd say they go maybe 30 to 35 miles an hour.

"Over a short distance a good greyhound will outrun 'em at a ratio of about 7 to 5. My hounds have never been outrun though a coyote can outendurance them if he gets a few breaks. Every second a hound hesitates the coyote gains ten yards.

"I'd hate to see the day when they're all gone. They're as much a part of the West as this land. That's why I never hunt any later in the spring than March. The bitches are all heavy with pups by then and you have to give them a chance.

"I came on a fellow once who was digging out a den. 'How much do you get for

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those pups?' I asked him.

" 'Three dollars,' he said.

" 'How many do you have?' I asked.

" 'Six.'

" 'I'll give you eighteen dollars to let 'em go,' I said, but he'd already killed them."

We were a good many miles from home by this time. We hadn't found a trace of our quarry. The shadows were beginning to lengthen again as the landscape took on that rosy hue that sets in so early on a winter afternoon. With undisguised reluctance Herb gave up the chase and we headed back to the ranch. I had relaxed my vigilance and was studying an interesting-looking grey-and-black rock close by a fence post. As we approached, the rock moved.

"It's a badger," Herb whispered, "sit still!" He whipped the Jeep broadside to the fence and jerked the rope. The run was over in nothing flat. But the fight went the limit. The stiletto-like teeth of the badger found their mark again and again and the savage claws raked muzzle and chest as the hounds yelped and cried.

"That's courage for you," Herb cried. "Look at that. His guts are all over the flat, but still he fights."

But even the bravest badger is no match for six hounds and in a few minutes the fight was over. The carcass was stowed beneath the dog box as the hounds licked their wounds. After they had cooled off, Herb loaded them again and we hit the road for home.

By the time we got back to the ranch and the dogs were put up we realized it had been more than a few hours since breakfast. Again Mrs. Stoddard's patience came to the fore. We had barely crawled out of our jackets and boots when a dinner fit for any hunters appeared on the table. "You get used to living in suspense when you've been married over forty years to a man like this," she said. "When he goes hunting, time doesn't mean a thing. I wasn't expecting you very early, anyhow." Herb devoutly made the Sign of the Cross and said grace and the feast was on.

Just before dark we made one more brief and unsuccessful foray in a big pasture close to headquarters, fed the rabbit to the dogs and called it a day.

The next morning it was up and out in the dark again as Herb told about the cowhand who used to work for him and spread the word after he left, "Stoddards' is a good place to work but a heck of a place to sleep. My boots used to still be warm when I'd

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put them on in the morning."

We loaded the same pack of hounds we had used the day before into the Jeep, leaving Gyp, the hound with the broken toe, and a couple of young dogs at home.

Skinny's Springs was our immediate objective and as soon as we were through the first gate we turned the dogs out and let them loosen up.

We saw no more coyotes that second morning than we had the first. Shortly past noon we pulled into Norris, "a town with houses on both sides of the street," as Herb described it, though the street is no more than a hundred yards long and the houses are rapidly-deteriorating specimens of early Twentieth Century Americana. There we picked up the makings of a lunch as Herb joshed with the Indians who make up the bulk of the town's population.

Late afternoon found us down on a piece of summer pasture belonging to Herb's friend, Shorty Hannum, an ex-jockey and "a darn good cowman."

"Wouldn't it beat you?" asked Herb. "That's the way is goes every time. Two weeks ago I went out with my son-in-law and we caught four coyotes in one morning. Here we've hunted almost two days and haven't caught a thing."

That must have been the password, for at that moment a big, rusty coyote dashed across our path. Herb didn't even have to turn the Jeep. He just jerked the rope and the hounds were off and running. The coyote headed for a break a good half-mile or more away across the range, his ears back, his tail down and his hind feet throwing dirt at the hounds as he streaked along. Golly, he was fast! But not fast enough. He was still fifty yards from the break when the little red bitch lunged and grabbed his hip. As he turned to strike back, Pat, one of the brindles, got his throat. That was it.

We drove up with the Jeep, picked up the carcass and slid it in beneath the dog box. Tomorrow Herb would skin it and add the pelt to his growing collection in the trees behind the ranch house. He had twelve already in about a month of hunting. With a little luck and less competition from the flyboys he might even get close to the record of 88 he caught back in 1942.

The sun was a big red semi-circle now, sinking behind one of Shorty's windmills. A few big, fluffy clouds had picked up the rose and saffron tints of its dying moments. The air was growing colder with another promise of snow and the only sound that could be heard was the distant bellowing of a bunch of newly-weaned calves.

As we waited for the dogs to cool off, Herb fell into a reflective mood. "My dad saw to it I had a better-than-average education," he said. "He wanted me to be something big."

He looked off to the north, up where the last rays of the now invisible sun were playing on the far-off buttes of the badlands. "What could be bigger than this?" he asked. For the life of me, I couldn't answer him.

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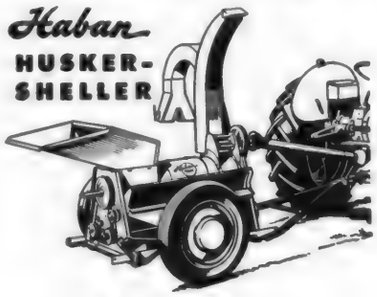

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ROBERT BAKEWELL
(*Continued from page* 98)

where you want them to weigh, in the roasting instead of the boiling pieces." He also developed a strange method of comparing animals to evaluate his progress. In the house at Dishley he maintained a museum of the bones of some of his stock and kept other portions in pickle. Parts of the cow Comely were pickled when she was slaughtered at an aged 26 and Bakewell proudly showed visitors the fat over her sirloin measuring a good four inches.

With his sheep-breeding, Bakewell went even further. Not only did he know the kind of animal which would make the farmer a profit, he also knew the class of people who would eat his sheep and the kind of meat they liked. He bred his sheep for the growing class of working man who liked plenty of fat on the meat. The butchers objected; they wanted the fat in the body cavity where it could be removed and sold for tallow. Bakewell ignored them. He produced a low, blocky animal with a barrel-shaped body with plenty of fat over the meat, particularly over the shoulders, which the poor would enjoy both as fresh meat or pickled "when it could hardly be distinguished from good bacon."

In selecting his sheep, he used the same independence he had shown in picking his cattle. He passed by the big-boned, long-wool sheep then popular in Leicestershire and searched out the small-boned, blocky individuals for his breeding stock. When he found animals which looked right and felt fat on the ribs next to the forelegs he began inbreeding to fix these qualities.

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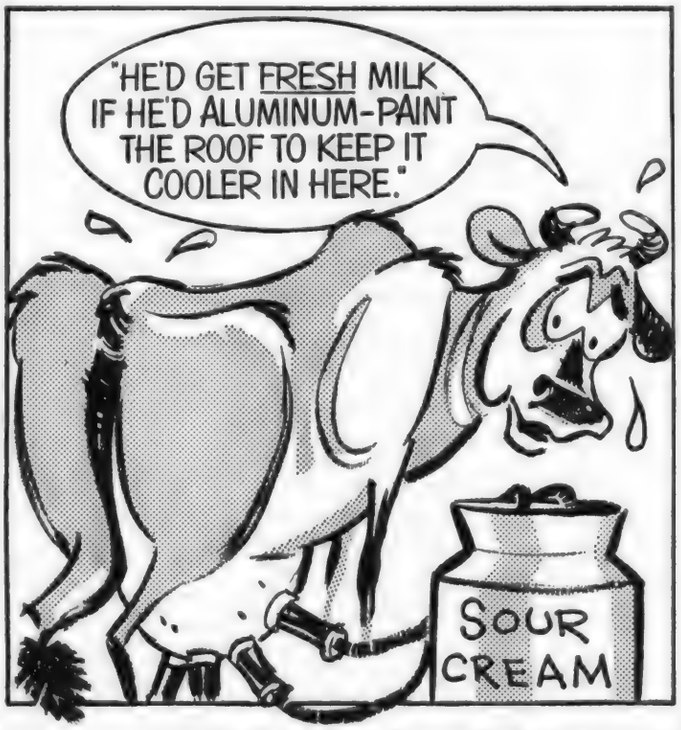
He insisted his sheep make rapid growth on normal farm feeds without any pampering. Often he tested batches of them and compared them with imported sheep by tying them in stalls and feeding them measured amounts to find how much feed it took to make a pound of mutton. One summer he turned six ewes out onto the narrow roads of the neighborhood to forage for themselves as a test of their hardihood.

With ruggedness added to fast growth, Bakewell came close to his ideal. William Marshall, an agricultural writer of the time, who saw the sheep and some of the bones in the Dishley museum believed this. "I have seen a rib of a sheep of this breed contrasted with one of a Norfolk sheep," he wrote, "the disparity was striking; the latter nearly twice the size while the meat which covered the former was three times the thickness. Therefore, in this point of view, the improved breed has a decided preference. For, surely, while mankind continues to eat flesh and throw away bone, the former must be, to the consumer at least, the more valuable.

"The other offal is also light. The pelt thin, and the head small; and, it is said, the intestines, and even the blood, are small in similar proportion."

As Bakewell fixed and developed his ideal type, he ran into the problem of every livestock breeder. It takes large numbers of offspring to prove the desirable qualities of any sire. Bakewell solved this problem neatly and profitably. He began leasing rams rather than selling them. In the beginning he had a hard time finding takers. His first prices were a few shillings, but as his reputation grew he was able to lease rams at a guinea (one pound and one shilling which then was roughly $5.25 and is now $3.00). By 1784 he was collecting 100 guineas for his best rams and in 1789 he leased three rams for 1,200 guineas. The highest price he received was for Two Pounder which brought 800 guineas for a single season's use with the reservation by Bakewell that he could breed the ram to one-third of the number of ewes specified in the contract. At 800 guineas for two-thirds of the use of the ram, Bakewell made an incredible 1,200 guineas or $3,600 (even at today's low exchange



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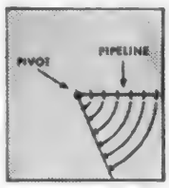

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rate) for the use of Two Pounder for a season.

Another device created by Bakewell for progeny testing and for popularizing the Dishley sheep was the organization of the first rudimentary breed association. The Dishley Society or Tup Company (a tup is a ram) was organized by Bakewell and 16 other sheep breeders in the area who had used his rams and improved their stock. The members paid Bakewell 3,000 guineas a year for the use of the best three rams from his flock. The group also set up rules as to ram showing and leasing. Bakewell promised not to lease a ram for less than 50 guineas and the other members agreed to charge 10 guineas or more. They all felt the best method of leasing was not to fix a price for the ram, but accept competitive bids from their customers.

With his best rams available to the breeders in the Dishley Society, Bakewell said, "They rise a peg every year, and their pegs would soon be higher than mine if I stood still; but we must contrive that my peg moves as well as theirs." This he did by having the best ewes to start with and constantly improving them.

Each breeder showed 40 rams for lease. The rams were selected at weaning and were put on the best feed to bring them to show condition on June 6 of the following year. All the breeders showed at the same time and all held open house for visitors for a few days before the show. Bakewell found

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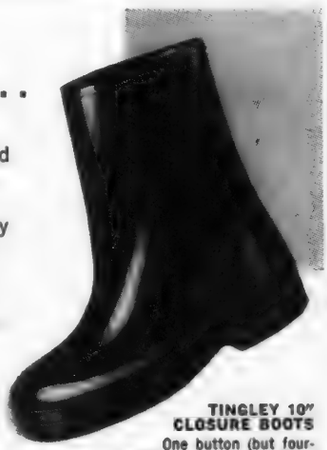

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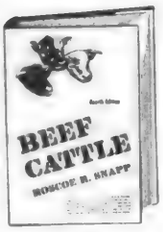
Livestock Books



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the best method was to show one ram at a time so the poorer of his stock didn't suffer by comparison with the best. He leased his rams to the top bidders and then put the rams back into common pasture to bring them into breeding condition. The leasor of the ram agreed to the number of ewes which would be bred to the ram. Bakewell assumed all risks while the ram was in use.

With such wide use of his rams, Bakewell was able to check on their ability to transmit the desired qualities to their offspring. The best rams discovered by this profitable method of progeny testing were used in his own flock at Dishley and helped him keep a peg above his fellow breeders.

This same system of progeny testing through leased sires was used by Bakewell with his bulls and stallions with the same profit to Bakewell and improvement of his stock.

No animal was ever mistreated at Dishley while Bakewell was around and he took great pride in the gentleness of his stock. Bulls and stallions were often shown by children and rams practically showed themselves in front of the visitors.

As a practical joke, Bakewell once borrowed a couple of Norfolk rams from the Earl of Leicester's farm at Holkham without his Lordship's knowledge. The next time the Earl visited Dishley, Bakewell put on a special parade of his fine, docile rams at the end of which two men led out the Earl's big-boned, black-faced Norfolks. At a signal from Bakewell they were released and bolted, clearing all the hurdles in fine style. His Lordship is said to have roared with laughter.

As a horse breeder, Bakewell followed his own independent system: first, forget the frills and decide what kind of animal you want to produce; find the parent stock most likely to produce the ideal; and when you have what you want, inbreed to fix the type. In horses, he wanted a more active, closer-coupled animal than those then in vogue, one which would move faster and do more work on less feed. He imported Dutch mares and crossed them with the best of the local draft horses. The result of his breeding was a short-coupled black horse which has since developed into the Shire breed. He increased the walking speed of the farm horse from two and a half to four miles an hour and he got more miles to the gallon of oats than his neighbors. By royal invitation he brought one of his stallions to show before Farmer George and the Prince of Wales in the courtyard of St. James' Palace. This animal approached Bakewell's ideal, short legs, short body with head held high, the ears standing perpendicularly over the forefeet. The royal farmer was delighted with the great plow horse.

Bakewell customarily used both cattle and horses for plowing. The cattle were always heifers, trained to the yoke to pay their way until they joined the breeding herd. The horses he used two abreast, in contrast to his neighbor's use of four to seven horses hitched tandem, and he

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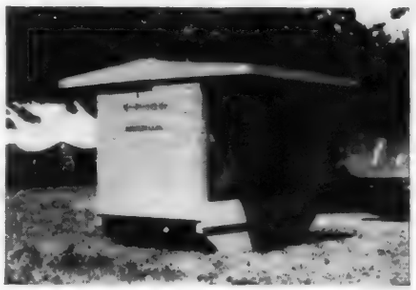

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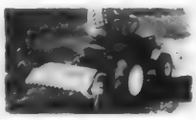

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plowed four acres a day with them—about four times as much work as his neighbors got from a pair of their horses.

Bakewell bred pigs at Dishley, but this was less of an enterprise than his work with other classes of livestock. He followed his usual practice of inbreeding and performance testing, sending three generations of sows back to the same superior boar owned by a neighbor. William Marshall, the agricultural writer, stated that the breed "has been highly improved, by this incestuous intercourse." Those who opposed inbreeding, however, said the Bakewell pigs were all rickety or all fools.

In spite of criticism, he continued to breed toward a meat-type, fast-growing animal which could convert a small amount of feed into a large amount of pork. He maintained an experimental sty divided into three pens in which he tested nine pigs at a time—three to a pen—weighing all the feed given to them and noting their rate of growth. All weights were chalked on a blackboard and later transferred to Bakewell's notebook.

With his success in changing the conformation of stock to achieve a desired end, Bakewell became supremely confident. A French visitor at Dishley, Francois de la Rochefoucauld, wrote: "He is now so sure of himself that he will make an offer to anyone to produce an ox for him that will put fat on the head or the back or even in such parts of the chest or stomach as do not usually grow fat. He even offered to make us a bet that he could breed some beasts that put on fat in the tail."

Bakewell is said to have believed dogmatically in only two agricultural principles: "like will produce like; and animal manure is the main science of husbandry." He believed in the ascending spiral of agriculture: "more crop, more stock; more stock, more manure; more manure, more crop." At Dishley he did away with the use of straw as bedding, designing his stalls so short and narrow there was barely room for the animals to stand which caused their manure to fall into the central gutter where it was easier to collect. He fed straw instead of bedding it and increased its value as manure. To increase the consumption of straw, he fed small amounts of it several times a day. When he had more straw than he could feed, he borrowed neighbors' animals and fed them for their manure. The manure was held under cover to prevent leaching and was then transferred to the land. This was at a time when many farmers used manure to plaster their houses to insulate them against the cold and used great quantities of it as fuel.

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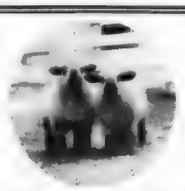

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ting aside plots which were manured but not watered, watered but not manured, and some which were both manured and watered. He was quickly convinced that both water and manure paid for the effort of application.

His neighbors disagreed. Not only did they think him a fool for irrigating, they feared that some of his irrigation water might get on their land and ruin it. They sued him and forced him to dig diversion ditches to prevent such a catastrophe.

In studying his irrigation project, Bakewell conceived the idea of making water do some of the farm work. When hay, carrots, and cabbages were harvested on far fields he loaded them onto boats and let them float down to the barn. With turnips—an important farm crop which he introduced into the area—he simply topped them and threw them into the canal. They floated to the barn where the water escaped through a sluice grating and the turnips rolled out onto a pile.

Feeling that a good supply of water was most important to his stock, he built ponds in all of his pastures. These he fenced to prevent stock wallowing in them and built rock drinking troughs to the side which were constantly filled by gravity.

He also used his irrigation water in another curious way—to deliberately cause a disease in his sheep. He did this by combining two of his problems. As a producer of expensive breeding stock, Bakewell wanted to make sure the sheep he sold for slaughter were killed and not resold for breeding. As a sheepman he, like others of his time and since, was troubled with foot rot—which was then referred to as "the rot." He studied the disease and concluded it came from water flowing across a pasture after the first of April. He believed this flowing water caused an excessive growth of what he described as slashy grass which in turn caused the rot.

He prevented the rot by keeping his sheep off such pasture. Arthur Young, the great agricultural writer of that time, describes his solution to his other problem, "when particular parcels of his best-bred sheep are past service, he fats them for the butcher; and, to be sure that they shall be killed, and not go into other hands,

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he rots them before he sells, which, from long experience, he can do at pleasure."

Though Bakewell was a born investigator and experimenter, he felt the financial burden of carrying on such work. He urged the government as a national policy to set up experimental farms to carry on the kind of experiments which he had found enriched agriculture and the nation. At one point in his life, when he was in his early sixties, he went bankrupt and would have lost all of his valuable stock and so ended his breeding work had not his friends raised a subscription of several thousand pounds to bail him out. Bakewell justified their faith in his ability and ended a wealthy man.

One of the causes for his bankruptcy was that, despite his shrewdness as a businessman, he was a too-generous host. And Dishley attracted men from all over the world who were interested in agriculture. So many guests stopped over at the farm the Earl of Leicester said, "Dishley is the best inn on the road." He entertained everyone who stopped by, Russian princes, French and German dukes, and British peers. The company, however, did not change Bakewell. No matter who was dining at Dishley, he sat alone at a small, round table near the window. He remained a bachelor all of his life and depended upon a widowed sister to keep his house. Like many bachelors, he developed rigid habits. Breakfast was served at 8, dinner at 1, and he ate alone at his small table at 9. After supper he would show his guests the pickled joints of old Comely or the preserved skeleton of one of his other great animals and talk with them about farming. But sharply at 10:30 he knocked out his last pipe and was in bed and asleep by 11.

Bakewell was not a writer and did not speak freely about the exact matings of his stock. During his lifetime he was accused of secrecy and of attempting to make a mystery of his breeding methods. But with William Marshall and Arthur Young he apparently discussed his methods quite candidly. It is now known that he communicated quite freely with men who came to Dishley to make a serious study of his methods. The Colling brothers, who founded the Shorthorn breed which was eventually to supplant Bakewell's longhorns, were given access to his breeding methods. Recently a collection of Bakewell's letters to another former student, the eminent breeder, George Culley, were discovered and printed by Professor H. Cecil Pawson of Durham University, which show Bakewell supplied Culley with details of his experiments with the idea that they would be included in Culley's *Observations on Livestock*.

Bakewell died in 1795 in his seventieth year and was buried on the rented farm he had made famous. His livestock and his crammed notebooks were left to his sister's son. Perhaps his valuable notes will some day turn up in a find such as the one made by Professor Pawson. Enough was written about him during his lifetime, however, to make it entirely fitting for Rice, Andrews, and Warwick when they wrote their book, *Breeding Better Livestock*, to dedicate it "To Robert Bakewell, who pioneered in breeding better livestock."

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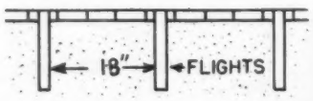

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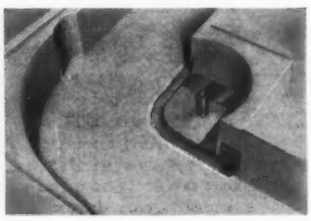

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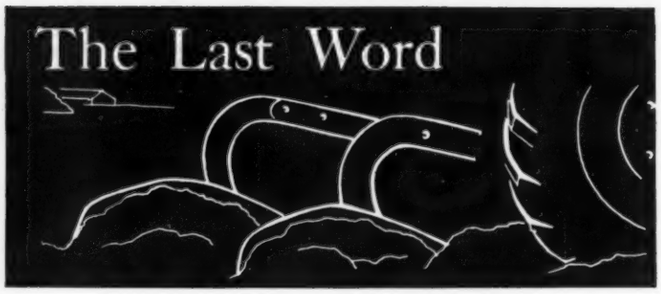

Trial by Headline Time was when a man or group was considered innocent until proved guilty—now those in power have found a way to get around this constitutional guarantee. Any political figure important enough to attract a full house press conference need simply issue a charge. There is no hearing or conviction. Punishment follows automatically from public condemnation. The technique works best when the act being condemned is utterly indefensible such as dishonesty or bribery or subversion or poisoning women and children. Then, anyone protesting the trial by press conference is put in the awkward position of appearing to support the depraved act under condemnation. We were dismayed to find the Secretary of Health and Welfare using just this technique in his blast against the tainted cranberries and the chemically-emasculated cockerels (made so, incidentally, with the full approval of the Department of Health and Welfare).

The Secretary managed to frighten the nation and to punish a whole segment of agriculture, needlessly, we feel. Needlessly because his department then captured the headlines for another week claiming credit for working night and day to test and release practically the entire crop in time for Thanksgiving. Unfortunately, we had lost our appetite.

It may be the Secretary chose cranberries just before Thanksgiving in order to dramatize his predicament in administering a most difficult law. At least we can be thankful he didn't wait until Christmas—he might have quarantined Santa Claus.

The Delaney Amendment Some years ago a legislator introduced a bill in one of our sovereign states making pi legally 3.1. Every school child who hated memorizing long strings of numbers was grateful each time he figured the circumference of a circle. That the answer was always wrong was of no consequence; *legally* it was right. We are reminded of this old law every time we read the 1958 Amendment to the Federal Food, Drug, and Cosmetic Act. The amendment, introduced by Representative James J. Delaney of New York, states that no new food additive shall be deemed to be safe until it is proved it will not induce cancer when ingested by man or animal. The result of this amendment was to cause the Food and Drug Administration to put a freeze on licensing any further feed additives for livestock and to begin declaring unsafe such items as chemically-caponized birds which its own scientists had found to be safe.

We firmly believe this nation must have legislation to protect the consumer against dangerous food additives. We also believe farmers must use agricultural chemicals according to the carefully-tested recommendations on the label and that sharp penalties should be administered to those who fail to do so. We also believe that the amendment is unworkable since it attempts to perform by legislation what can only be done by sound scientific judgment.

Protean Augers When we described a flexible auger in our Winter issue, we were under the impression we had reached the ultimate in auger adaptability. Hardly was the issue off the press, however, when we discovered still another changeable auger. This one, invented by an Iowa farmer, Byard Heiken, has the ability to telescope in or out—up to 90 per cent of its fully retracted position. The auger is fully flighted in any length—in other words it carries grain rather than pushing it even when fully extended. This it does by screwing in on itself when shortened. Heiken designed the auger to be used on self-unloading wagons to reach bins without too much maneuvering.

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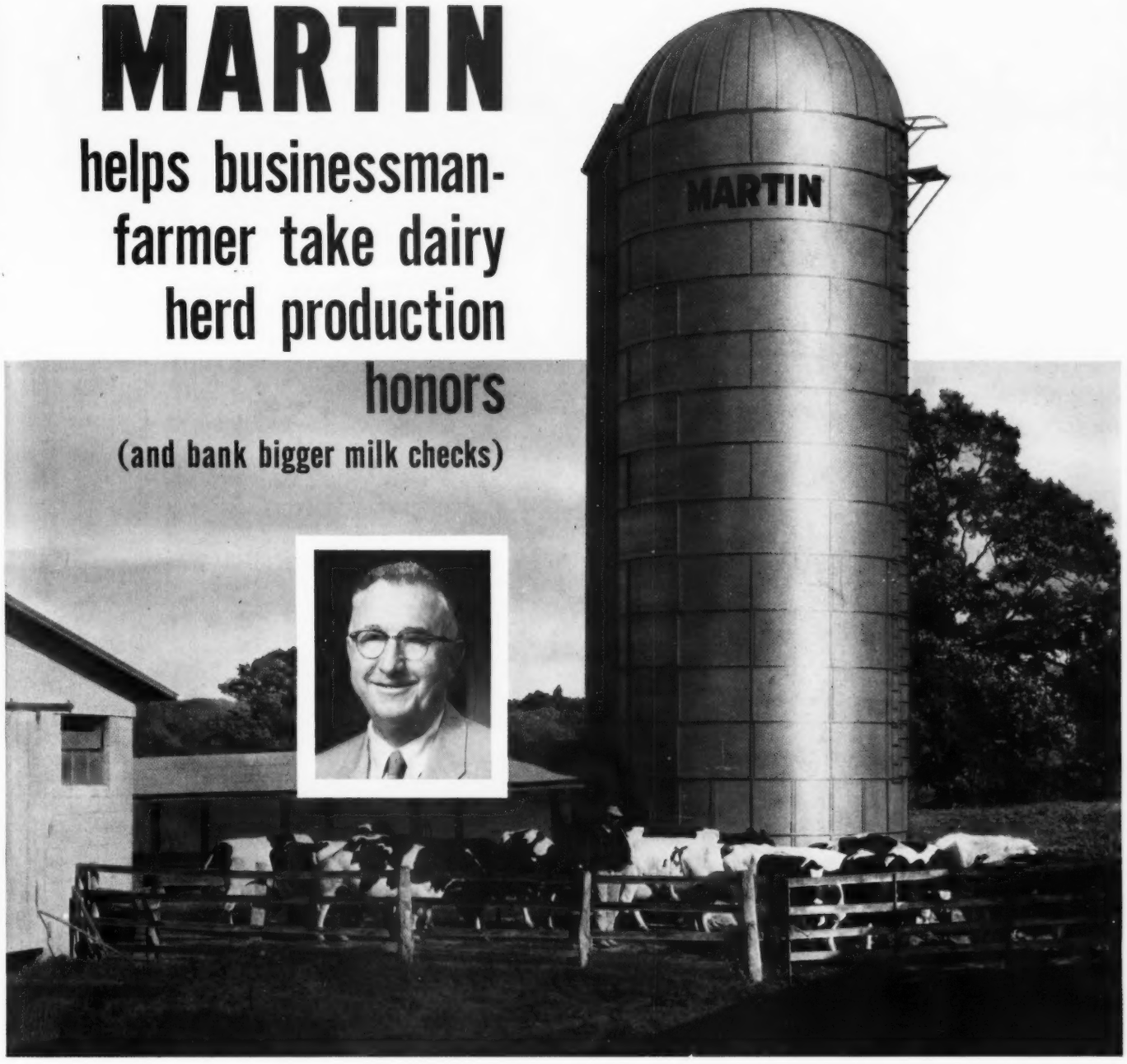

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